

APPENDIX L

INTERNATIONAL SPACE RESEARCH PARK (ISRP) KENNEDY SPACE CENTER, FLORIDA ENVIRONMENTAL SITE ASSESSMENT REPORTS

**INTERNATIONAL SPACE RESEARCH PARK (ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

Phase I

Prepared for:

Environmental Program Branch
National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

Prepared by:

J-BOSC
Environmental Health and Services
Environmental Compliance and Public Health
SGS-6230/CHS-022
Kennedy Space Center, FL 32899

January 2004

**INTERNATIONAL SPACE RESEARCH PARK (ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

Prepared for:
Environmental Program Branch
National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

Prepared by:
J-BOSC Environmental Health and Services
Environmental Compliance and Public Health Section
SGS-6230/CHS-022
Kennedy Space Center, Florida 32899

Prepared by:

Laura Sardella, CFEA, REPA
CHS, Inc.

Approved by:

Wilson R. Timmons, Jr., P.G.
CHS, Inc.

January 2004

This Environmental Assessment Site Report was prepared in accordance with sound professional practices. The report has been reviewed and certified by a Certified Florida Environmental Assessor/Registered Environmental Property Assessor registered with the Florida Environmental Assessors Association and the National Registry of Environmental Professionals.

Laura Sardella, CFEA, REPA
Registration #s CFEA 287, REPA 6131

ACRONYMS

AST	Above Ground Storage Tank
ASTM	American Society for Testing and Materials
bls	Below Land Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFEA	Certified Florida Environmental Assessor
CHS	Comprehensive Health Services
DCE	Dichloroethene
DPT	Direct Push Technology
ESA	Environmental Site Assessment
ESAR	Environmental Site Assessment Report
EC&PH	Environmental Compliance and Public Health
ESPC	Environmental Sanitation and Pollution Control
EDC	Engineering Document Control
EH&S	Environmental Health and Services
EPA	Environmental Protection Agency
EPB	Environmental Program Branch
ESA	Environmental Site Assessment
FDEP	Florida Department of Environmental Protection
FID	Flame Ionizing Detector
FLUCCS	Florida Land Use Classification Codes
F.S.	Florida Statutes
Gal	Gallons
GCTL	Groundwater Cleanup Target Level
GSA	Government Services Administration
ISRP	International Space Research Park
J-BOSC	Joint Base Operation Support Contract
JRASA	Jerome Road Agricultural Shed Area
KSC	Kennedy Space Center
LOC	Location of Concern
LTM	Long Term Monitoring
MILA	Merritt Island Launch Annex
mg/L	milligrams per Liter
MSDS	Material Safety Data Sheet
µg/L	micrograms per Liter
NASA	National Aeronautics and Space Administration
OVA	Organic Vapor Analyzer
PCAR	Petroleum Contamination Assessment Report
PAH	Polynuclear Aromatic Hydrocarbons
PH	Pump House
PRL	Potential Release Location
SGS	Space Gateway Support
STDNS	Spaceflight Tracking and Data Network Station
SJRWMD	St. John's River Water Management District
S-Band	Unified S-Band Station

STS	Soil Treatment Services
SVOCs	Semi Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leachate Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TRPH	Total Recoverable Petroleum Hydrocarbons
USFW	United States Fish and Wildlife
USGS	United States Geologic Survey
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds

**INTERNATIONAL SPACE RESEARCH PARK (ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

EXECUTIVE SUMMARY

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 107(b) creates the “innocent land owner defense”, in which any tenant, at time of land acquisition, did not know or have reason to know of land contamination. Chapters 376 and 403, Florida Statutes (F.S.), regulate the liability and defenses to Florida land contamination issues. F.S. Chapter 376, as currently amended, provides “innocent land owner defense” law similar to that implemented in the CERCLA statute.

To satisfy these requirements, appropriate inquiry into the land parcel must be conducted. A Phase I Environmental Site Assessment (ESA) has been written for the proposed International Science Research Park at Kennedy Space Center (KSC). The ESA was conducted in order to identify areas of environmental concern, satisfying this requirement for the innocent land owner defense. This report was developed for the future site of the International Space Research Park (ISRP) site to satisfy this requirement.

The ESA was conducted in accordance with American Society for Testing and Materials (ASTM) E-1527, Phase I Environmental Site Assessment Process. The Environmental Site Assessment (ESA) will be performed in accordance to ASTM E-1528, for the proposed Phase II Environmental Site Assessment. ASTM E-1527, states that the Phase I ESA defines good commercial and customary practice for environmental contaminants within the scope of CERCLA and petroleum products. ASTM E-1528, Environmental Site Assessment, defines the scope of an investigational environmental site assessment, and will be followed during the sampling phase of the investigation.

To identify potential environmental impacts related to previous operations and usage at the proposed ISRP site a Phase I ESA was conducted. The ESA included site reconnaissance, interviews with personnel possessing knowledge of past and present work practices and operations at the site, previous investigation reports, adjacent site investigations, KSC collections of historical aerial photographs and property records were reviewed. Current site conditions, as documented in aerial photographs taken on May 24, 2000 KSC fly-over, were reviewed. The objective of the assessment was to identify potential locations and contaminants of concern at the ISRP and the need, if any, for further study, through environmental sampling.

This Environmental Site Assessment Report (ESAR) was prepared by Joint Base Operations Support Contractor (J-BOSC) Environmental Health and Services (EH&S), which supports the NASA/KSC Environmental Program Branch (EPB). The report summarizes the findings of the ESA, which was conducted by J-BOSC Environmental Compliance and Public Health (EC&PH). A sampling plan and subsequent sampling will be conducted by J-BOSC EH&S, EC&PH section.

TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
ACRONYMS	i
EXECUTIVE SUMMARY	iii
TABLE OF CONTENTS	iv
1.0 INTRODUCTION	1
2.0 SITE LOCATION, DESCRIPTION, AND HISTORY	1
2.1 Site Information	4
2.2 Site Description and History	6
2.3 Site Topography and Hydrology	6
2.4 Site Ecology	6
2.5 KSC Soil Background Study	7
2.6 ISRP Area Previous Investigations	8
3.0 ADJACENT PROPERTY DESCRIPTIONS AND HISTORIES	9
3.1 Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU # 21	9
3.2 Ransom Road Reclamation Yard, SWMU # 10	10
3.3 Ransom Road Landfill, SWMU # 3	10
3.4 Spaceflight Tracking and Data Network Station (STDNS), PRL #73	11
3.5 Jerome Road Agricultural Shed Area, PRL 57b.	11
3.6 Adjacent Properties Environmental Investigations	11
3.6.1 Adjacent Property EC&PH Previous Investigations	11
3.6.1.1 Ransom Road Corrosion Control Previous Investigations:	12
3.6.1.2 Ransom Road Sandblast Yard Previous Investigations:	12
3.6.1.2 Ransom Road Sandblast Yard Previous Investigations (cont.):	13
3.6.1.2 Ransom Road Sandblast Yard Previous Investigations (cont.):	14
3.6.1.3 Ransom Road Landfill Previous Investigations:	14
3.6.1.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations	14
3.6.1.5 Jerome Road Agricultural Shed Previous Investigations:	16
3.6.2 Other Adjacent Property Environmental Investigations	17
3.6.2.1 Ransom Road Sandblast Yard Previous Investigations:	17
3.6.2.2 Ransom Road Reclamation Yard Previous Investigations:	17
3.6.2.3 Ransom Road Landfill Previous Investigations:	18
3.6.2.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations (cont.)	19
4.0 ISRP PROPOSED SAMPLING LOCATIONS	21
4.1 PSL 1:	21
4.2 PSL 2:	21
4.3 PSL 3:	21
4.4 PSL 4:	21
4.5 PSL 5:	21
4.6 PSL 6:	21
4.7 PSL 7:	21
4.8 PSL 8:	22

4.9 PSL 9:.....	22
4.10 PSL 10:.....	22
4.11 PSL 11:.....	22
4.12 PSL 12:.....	22
5.0 SUMMARY, CONCLUSIONS, and RECOMMENDATIONS.....	22
5.1 Summary and Conclusions.....	24
5.2 Recommendations	24

REFERENCES

APPENDICES

Appendix A	List of Interviewed Personnel
Appendix B	Citrus Grove Lease Agreement
Appendix C	Citrus Grove Tank Closure Report
Appendix D	Quarterly Sampling Result Tables Pump House 6, 2001-Present
Appendix E	1943 Historical Aerial Photograph
Appendix F	Dynamac Corporation KSC Background Study Results
Appendix G	List of Federally and State Protected Wildlife Species Within the ISRP Area

ATTACHMENTS

Attachment 1 Sampling Paln for the ISRP

FIGURES

Figure 1. Location of KSC and ISRP Site	2
Figure 2. Aerial Photograph of the ISRP Area, May 2000 Flyover.....	3
Figure 3. Location of the ISRP Site and Adjacent Investigated Facilities.....	5
Figure 4. Topographic Map of ISRP Site	7
Figure 5. ISRP Proposed Sampling Location Site Map.....	23

**INTERNATIONAL SPACE RESEARCH PARK AREA
(ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

1.0 INTRODUCTION

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 107(b) creates the “innocent land owner defense”, in which any tenant, at time of land acquisition, did not know or have reason to know of land contamination. Chapters 376 and 403, Florida Statutes (F.S.), regulate the liability and defenses to Florida land contamination issues. F.S. Chapter 376, as currently amended, provides “innocent land owner defense” law similar to that implemented in the CERCLA statute.

To identify potential environmental impacts related to operations at the ISRP, an Environmental Site Assessment was conducted in September 2003. The ESA included review of previous investigations, review of adjacent site investigations, site reconnaissance and interviews with personnel possessing knowledge of past work practices and operations at the site (Appendix A). The KSC collections of aerial photographs (Appendix E) and US Fish and Wildlife Service Records (USFWS) (Appendixes B and C) were reviewed. The objective of the assessment was to identify potential locations and contaminants of concern at the ISRP site and the need, if any, for further study.

This Environmental Site Assessment Report (ESAR) was prepared by Comprehensive Health Services (CHS), Inc., subcontractor to Space Gateway Support (SGS), the Joint Base Operations Support Contractor (J-BOSC) for KSC for the NASA/KSC Environmental Program Branch (EPB). The report summarizes the findings of the ESA that was conducted in 2003 by Laura Sardella, CFEA, of Environmental Compliance and Public Health (EC&PH) Section of the J-BOSC/CHS Environmental Health and Services (EH&S).

2.0 SITE LOCATION, DESCRIPTION, AND HISTORY

KSC is located on the northern portion of Merritt Island, between the Indian and Banana Rivers in Brevard County, Florida (Figure 1). The ISRP site is located in Sections 1 and 12, Township 23S and Range 36E, Courtenay Quadrangle (USGS 1976).

The ISRP site (Figure 2) is approximately 2,700 feet by 6,000 feet and is located approximately 2,000 ft. north of Jerome Road, on the south and extends northward to Space Commerce Way. The east boundary is defined by State Road 3 and the western boundary is approximately 700 ft. west of the Ransom Road Landfill. The site is bisected by Ransom Road.

Figure 1. Location of KSC and ISRP Site

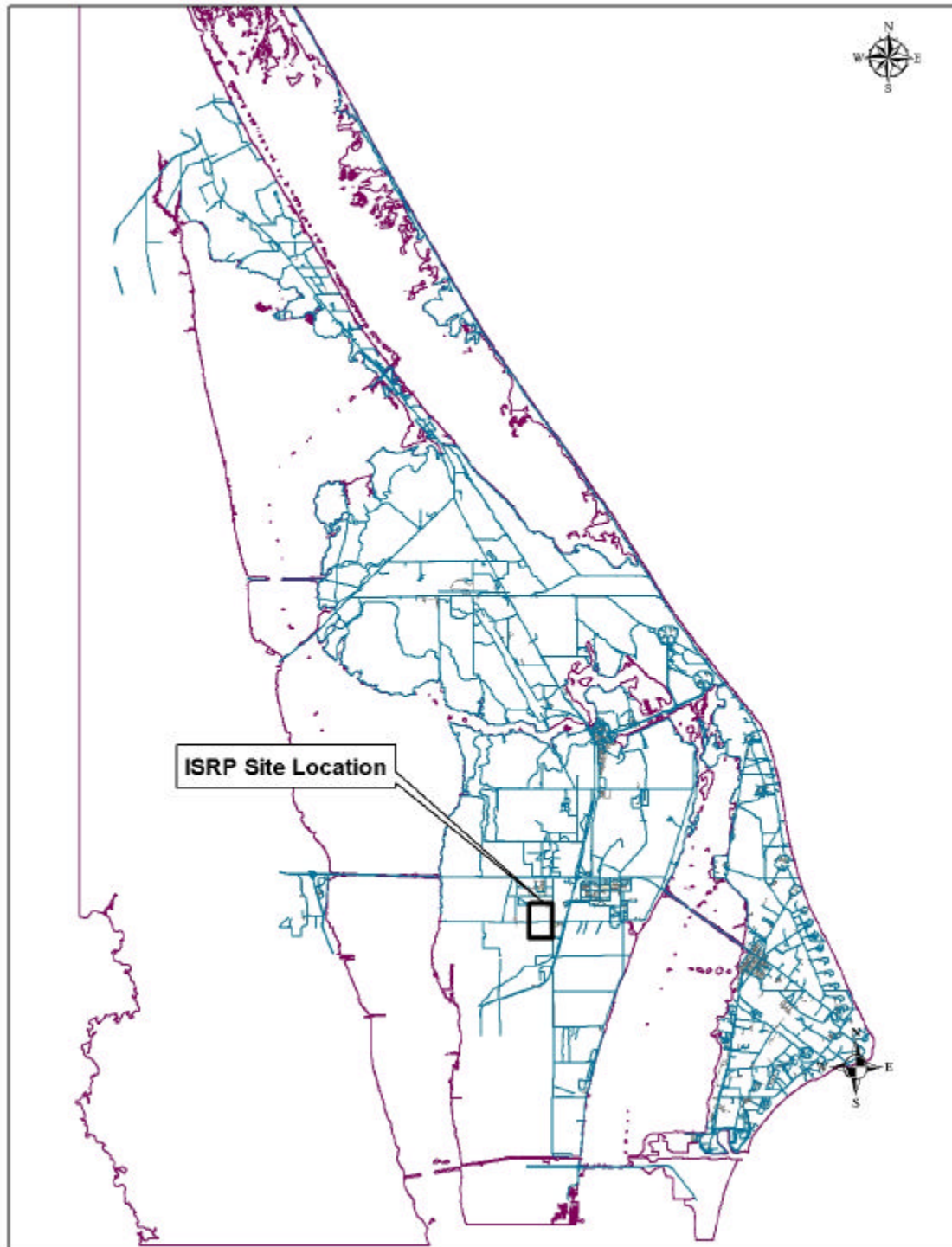
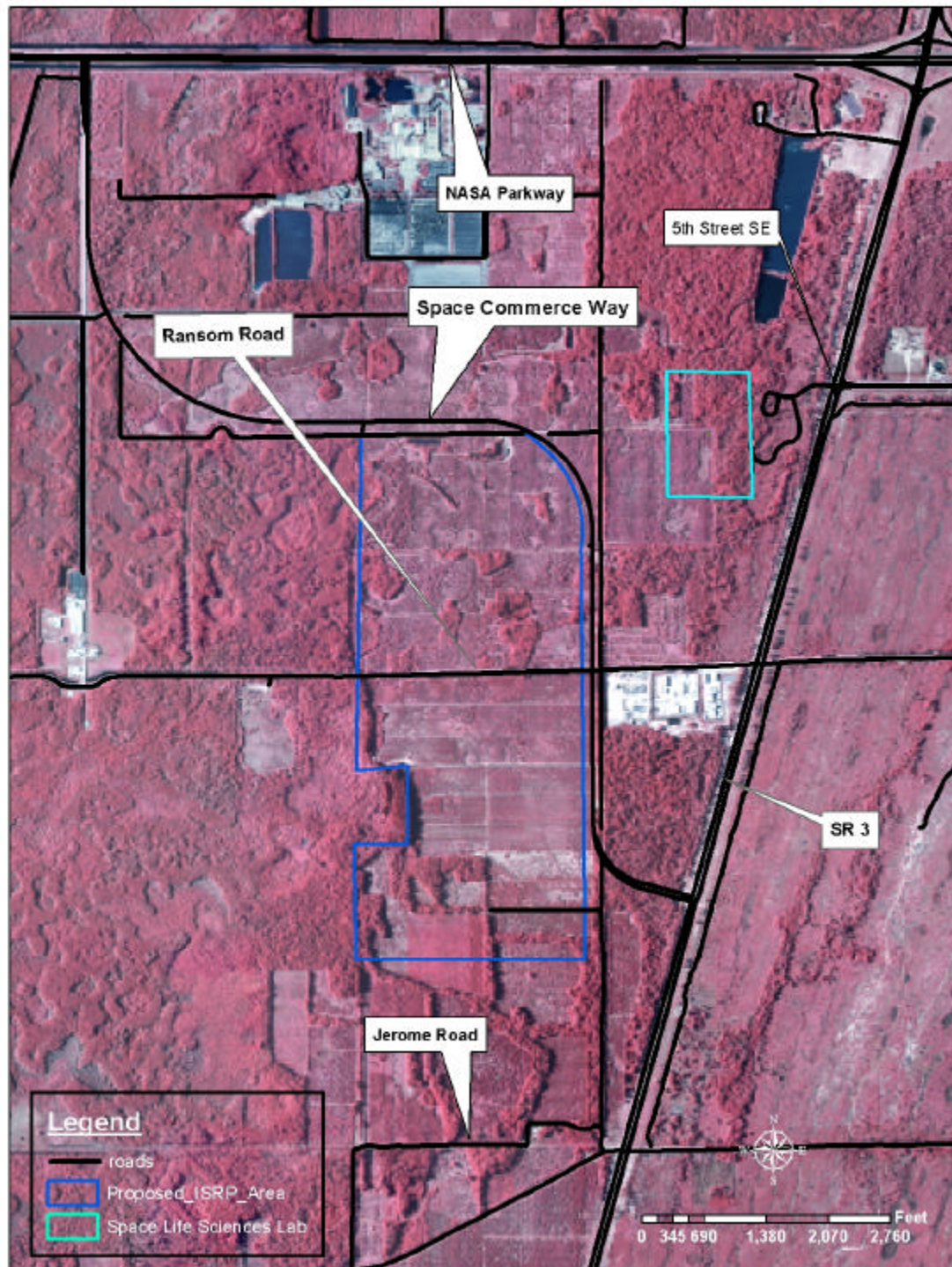


Figure 2. Aerial Photograph of the ISRP Area, May 2000 Flyover



2.1 Site Information

The ISRP site is currently, and historically has been, active citrus groves. With the exception of a power line along Space Commerce Way, there are no utility services located at the ISRP site. There are no known archaeological or historical sites or interests at the ISRP site. No Air, PCB, Asbestos, or Radon concerns exist at this site and therefore will not be addressed in this document.

The grove area, which is the proposed ISRP location, is a combination of viably active and abandoned citrus groves. Roy Roberts and the Kerr Foundation for Sustainable Agriculture currently fund improvements in the actively used groves.

In August 2002, an 8,000 gallon (gal) above ground storage tank (AST) was removed from the north end of the site, adjacent to the northern surface water features. At the time of tank removal, the tank contained petroleum based crop spray oil. A tank removal and contamination assessment report was issued in November 2002 and is enclosed as an Appendix C of this report. The secondary containment area for the tank was abandoned in place.

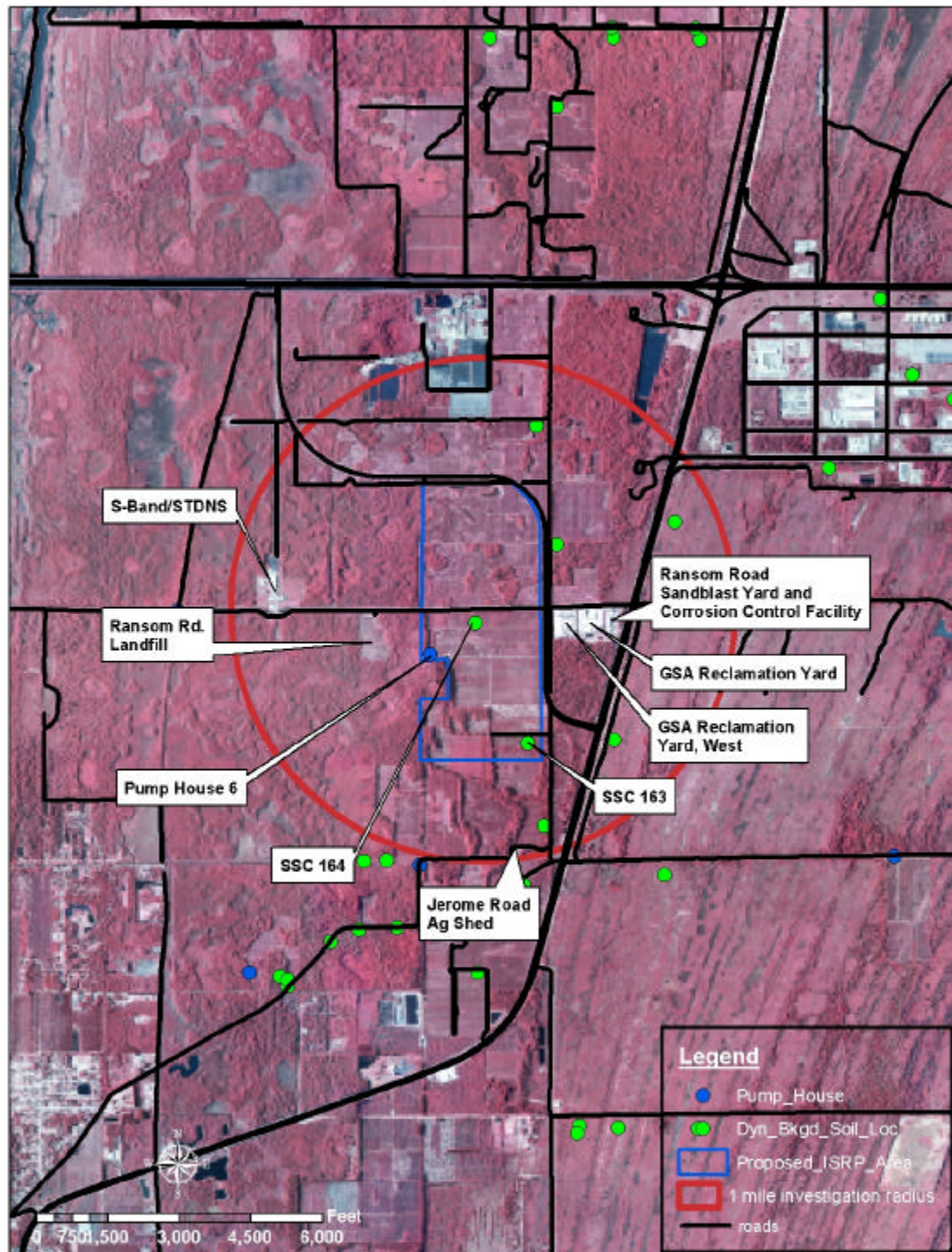
Environmental investigations have previously occurred at various locations at or near the ISRP site. Detailed information will be provided in Section 2.6 of this document.

There are four facilities within a 1 mile radius of the ISRP site that are identified RCRA SWMU locations (Figure 3). Three facilities identified SWMUs are undergoing Long Term Monitoring (LTM). These facilities are Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU # 21; Ransom Road Landfill, SWMU # 3; and GSA Reclamation Yard SWMU # 10. At Ransom Road Reclamation Yard, West, SWMU #36, a facility investigation has yet to commence.

There are two identified Potential Release Locations (PRL) adjacent to the ISRP site. Jerome Road Agricultural Shed Area, identified as PRL 57b, where a Phase II Investigation has been recently concluded and findings were presented to the NASA Remediation Team in August 2003. The second location, the Spaceflight Tracking and Data Network Station (STDNS), is identified as PRL #73. The facility has been referred to as the Unified S-Band Station (S-BAND), and the Merritt Island Launch Annex (MILA). Phase II sampling has been proposed and will be conducted in the near future.

Historical information and environmental investigation details from these locations will be summarized in Section 3.6 of this document.

Figure 3. Location of the ISRP Site and Adjacent Investigated Facilities



2.2 Site Description and History

In the early 1960s the United States government purchased 140,000 acres for Space Flight Launch Operations. The purchased land included 2,389 acres of citrus groves. NASA offered leasing agreements, through United States Fish and Wildlife Service (USFWS), to the former grove owners. The lease has been administered by the USFWS since 1963.

Lease records reviewed were supplied by USFWS. Records reviewed show the citrus groves are currently operated by Roy Roberts, in conjunction with the Kerr Center for Sustainable Agriculture. The groves are currently being studied to determine their agronomic and economic viability. The Kerr Center's contract with USFWS permits harvesting rights beginning June 1, 1998 through January 15, 2008. USFWS has no plans to continue citrus grove operations after the expiration of the current contract.

2.3 Site Topography and Hydrology

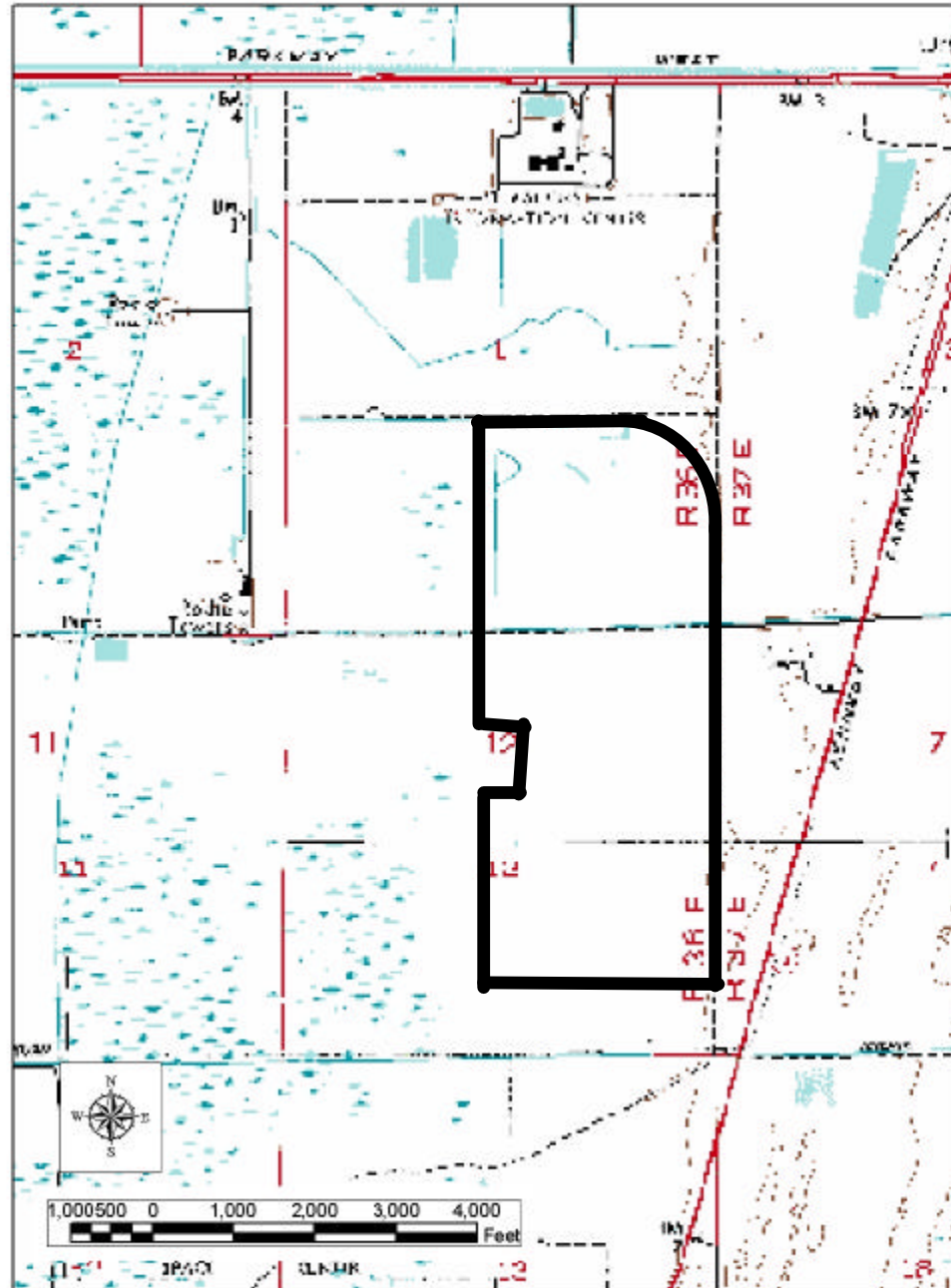
The topography of the ISRP site is relatively flat. Land surface elevations in the area are generally five feet above sea level (USGS, 1976 Courtenay Quadrangle Map, 7.5' Series). A topographic map of the site is provided in Figure 4. The KSC Background Study conducted by Dynamac Corporation, states the area consisting of the ISRP and surrounding groves are categorized as citrus hammock, and are located in the Indian River Lagoon Watershed. The St. John's River Water Management District (SJRWMD) 1995 Florida Land Use Classification Codes (FLUCCS) classifies the ISRP as citrus groves and upland mixed coniferous/hardwood, with soils consisting of Copeland-Bradenton-Wabasso complex and Riviera and Windar soils-depressional.

2.4 Site Ecology

The ISRP site has not changed significantly since the 2000 aerial photograph presented in Figure 2. The ISRP area does not provide a desirable habitat for indigenous fauna, and no ecological receptors were observed at the site during this investigation. A USFWS forester interviewed for this investigation stated the maintained grove benefited indigenous species of animals by providing open areas to travel between habitats. The location is expected to be habitat for indigo snakes, although it has not been officially recorded. Eagles are known to utilize the area for nesting materials and food scavenging. Invasive vegetative species, such as Brazilian pepper, cannot become established within the property, due to regular grove activities. However, the unmanaged grove has become overgrown with BP due to lack of management.

A list of federally and state-protected wildlife species potentially occurring within a half mile radius of the ISRP is presented as Appendix G of this report. This list is provided for guideline purposes only and was compiled from habitat/wildlife species relationship data collected from other sites on KSC by Dynamac Corporation.

Figure 4: Topographic Map of Site



2.5 KSC Soil Background Study

Seven KSC Background soil sampling locations are located within the one mile perimeter surrounding the ISRP site, shown in Figure 3. Two of the sampling locations, SSC 164 and 163 are located within the site boundary itself. KSC Background Values for soils were collected by the Dynamac Corporation in July 1999. The samples collected within the ISRP boundary did not yield detections for Organo Pesticides, PCBs, or Chlorinated Herbicides. There were detections for several Polynuclear Aromatic Hydrocarbons (PAHs) and metals, which values were detected over the accepted background values for Citrus Scrub.

2.6 ISRP Area Previous Investigations

A review of EC&PH special projects file indicates three previous contamination investigations were conducted within the ISRP boundaries. Any current investigations, and investigations occurring after 1998, are conducted by J-BOSC/CHS EH&S EC&PH. Investigations prior to 1998 were conducted by EG&G Environmental Sanitation/Pollution Control Branch (ESPC).

In various locations, within the KSC Citrus Groves, are irrigation pumps. Currently, the citrus grove pumps are monitored on a quarterly basis for the Kerr Center. One pump, Pump House 6 (PH-6), is located within the boundaries of the ISRP site. PH-6 and associated Diesel Tank are located on the southern side of Ransom Road. The last sampling event took place June 2003. Quarterly sampling at the site began in July 1997. Quarterly analysis includes Dissolved Oxygen, pH, Conductivity, Salinity, Turbidity, Nitrate, Nitrite, Total Nitrogen, Nitrate + Nitrite, Total Kjeldahl Nitrogen, Orthophosphate, and Total Phosphorus.

April 1999:

In April of 1999, ditch water and groundwater samples were collected to help determine if the water quality was suitable for citrus grove irrigation. Elevated TDS and chloride concentrations in the samples collected indicated that the water sources were not suitable for irrigation purposes.

May through July 1993:

A survey of the KSC pump house stations was conducted May through July 1993. Samples were collected to determine the vertical and lateral extent of soil contamination, resulting from diesel fuel and lubricating oils used in the operation of the pumps. Samples were analyzed in the field using an Organic Vapor Analyzer (OVA) equipped with a Flame Ionization Detector (FID) to determine the concentration of volatile contaminants. Soil samples were analyzed at the Environmental Health Field Laboratory for TRPH. Six surface soil samples were collected at Pump House 6 (PH-6). A recommendation of soil excavation to the rock layer, beginning at the western sample location to the culvert, was made for PH-6. According to one source, the soil was removed from the location. The diesel pump and associated tank are currently housed in a concrete containment adjacent to the water.

2.6 ISRP Area Previous Investigations (cont.)

September 1992:

In September 1992, soil sampling was requested at PH-6 to verify potential hydrocarbon contamination at the site. Soil samples were collected from an area in front of the entrance of the pump house and extending for approximately twelve feet. An additional sample was collected on the north side of the Pump House. Samples were collected until the rock layer was reached. Samples were analyzed in the field using an OVA equipped with a FID to determine the concentration of volatile contaminants. Soil samples were analyzed at the Environmental Health Field Laboratory for TRPH. Results indicated the site was contaminated with petroleum compounds.

3.0 Adjacent Property Descriptions and Histories

An area of one mile around the center proposed ISRP site was examined for previous environmental investigations and adjacent properties of concern, which could potentially impact the ISRP site. Identified properties of concern within a one mile perimeter include; four RCRA SWMU sites, two Potential Release Locations (PRL) sites, one grove irrigation pump house, and seven KSC Background Study soil locations.

Three SWMUs sites are currently undergoing Long Term Monitoring (LTM). These identified SWMU sites adjacent to the ISRP site are: Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU #21; GSA Reclamation Yard, SWMU # 10; and Ransom Road Landfill, SWMU # 3. A fourth SWMU site is Ransom Road Reclamation Yard, West, identified as PRL # 36, for which a site investigation has yet to commence.

Two identified Potential Release Locations (PRL) are adjacent to the ISRP site. Jerome Road Agricultural Shed Area, identified as PRL 57b, a confirmatory sampling investigation was recently concluded and findings were presented to the NASA Remediation Team in August 2003. The second location, the Spaceflight Tracking and Data Network Station (STDNS), is identified as PRL #73. A Phase I Investigation has been completed with a recommendation for confirmatory sampling.

3.1 Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU # 21

This facility began operations in 1967. The facility's primary function is for sandblasting and painting of equipment. Equipment to be sandblasted and repainted was degreased and steam cleaned prior to arrival at the facility. Currently, a steel/iron and plastic bead sandblasting media is used. Previously a silica and walnut shell sandblasting media was utilized. Presently, used sandblast media is disposed of in the Schwartz Road Landfill, under a variance issued by FDEP. Used sandblast media must be sampled for Toxic Characteristic Leaching Procedure (TCLP) for RCRA metals. Sampling results must be below TCLP standards for hazardous wastes.

3.1 Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU # 21 (cont.)

Various environmental investigations have been conducted at the site. The earliest recorded investigation, a site contamination survey, began in March 1990. HSW initiated RFI activities and site characterization at the site beginning in 1995. The RFI investigation, conducted by HSW Environmental Group, determined the groundwater flow to be west-northwest, towards the ISRP site.

3.2 Ransom Road Reclamation Yard, SWMU # 10

This facility began operations in the late 1960s. Ransom Road Reclamation Facility function is for the receipt and storage of materials, to be sold as surplus (not scrap or recycled) materials. These include items and materials that are no longer wanted, out of date, or damaged. The purpose of the fenced yard and its ancillary buildings is for safe and secure storage of these materials. No treatment or disassembly of components takes place in the fenced portion of the Ransom Road Reclamation Facility. Drum crushing had previously occurred at this location until 1996.

This facility was identified as a PRL and initially investigated in 1990, by EG&G ESPC. Environmental investigations impacts from activities of the facility are still actively under investigation. The site was later designated as a SWMU site and had undergone a comprehensive RCRA Facility Investigation (RFI).

The initial RFI investigation, conducted by HSW Environmental Group, determined the groundwater flow to be west-northwest, towards the ISRP site.

3.3 Ransom Road Landfill, SWMU # 3

Ransom Road Landfill was in operation from 1964 through 1968 as a disposal site for all types of debris generated during the growth and construction of the Kennedy Space Center. Solid waste cells were constructed via unlined trench and fill methods where approximately 60% of the waste was buried below the water table. Concerns by the FDEP that the use of the landfill may have adverse impact upon the groundwater quality in the area lead to the closure of the site in 1970. The landfill was covered by an earthen cap in 1991, as NASA's interim measure response to FDEP concerns.

Groundwater investigations at the landfill site date back to 1984. To fully comply with FDEP concerns, NASA implemented a RFI for the landfill. The RFI was completed in April 1997. In 2000, NASA submitted the collected data and the Statement of Basis. Upon review by the regulatory agencies additional groundwater data was requested. An RFI Addendum/Long Term Monitoring Plan was provided and additional groundwater investigations were completed in 2001. The historical groundwater investigations determined the shallow and intermediate groundwater flow in this area to be to the northwest, towards the Indian River.

3.4 Spaceflight Tracking and Data Network Station (STDNS), PRL #73

The Spaceflight Tracking and Data Network Station (STDNS) is identified as PRL #73. The facility is currently undergoing a confirmatory sampling investigation as part of the PRL investigation. The facility has been also referred to as the Unified S-Band Station (S-BAND), and the Merritt Island Launch Annex (MILA).

The STDNS uses radio frequency/microwave producing equipment and other equipment which operate utilizing frequencies which pose potentially hazardous sources of non-ionizing radiation (RF radiation). STDNS functions include: receiving and transmitting voice, tracking, telemetry, television, and command data to a spacecraft. Two 30-foot-diameter dish antennas and several other smaller antennas are located at the facility.

The KSC Background Study, conducted by Dynamac Corporation, states groundwater flow in this area is generally to the west toward the Indian River.

3.5 Jerome Road Agricultural Shed Area, PRL 57b.

The Jerome Road Agricultural Shed Area (JRASA), or Group II Agriculture Shed, site is identified as PRL 57b. The facility is currently undergoing confirmatory sampling, as part of the PRL investigation. The site is located within the citrus groves, directly to the south of the ISRP site

The Agricultural (Ag) shed consists of one enclosed room and covered area containing vehicles, grove equipment, pesticides, herbicides, fertilizer, motor oil, and hydraulic fluid. Several steel and plastic Aboveground Storage Tanks (ASTs) and 55-gallon drums are located at the site. A burn pit approximately 4 feet by 4 feet was also observed approximately 15 feet south of the western side of the shed. No sanitary facilities, potable water or septic/sewer, have ever been located on the site.

The KSC Background Study conducted by Dynamac Corporation, states groundwater flow in this area is generally to the west toward the Indian River.

3.6 Adjacent Properties Environmental Investigations

A review of both EC&PH and NASA files contained details of various environmental investigations conducted at facilities adjacent to the ISRP site. Details of the various investigations are provided in this section.

3.6.1 Adjacent Property EC&PH Previous Investigations

A review of EC&PH special projects file contained previous contamination investigations of the various properties, adjacent to the ISRP site. Any current investigations, and investigations occurring after 1998, are conducted by J-BOSC/CHS EH&S EC&PH. Investigations prior to 1998 were conducted by EG&G Environmental Sanitation/Pollution Control Branch (ESPC).

3.6.1.1 Ransom Road Corrosion Control Previous Investigations:

May 1999:

During May of 1999, five soil locations were sampled along the eastern side of the sandblast facility. The samples were only analyzed for PCBs. All samples were below the detection limits of 0.60 mg/Kg dry weight.

April 1997:

In April 1997, a storage tank was cleaned and the water was flushed into the retention area. The paint within the tank had reportedly contained lead, cadmium, and chromium. Sampling consisted of three surface soil samples. One sample at location #3 was the southern most sampling point, near a temporary storage area, yielded detections for lead of 30.3 mg/Kg and chromium 10.1 mg/Kg.

August 1995:

In August 1995, eight soil samples were collected from a mound of excavated soil. Samples were field analyzed by an OVA equipped with a FID. The results of the analysis yielded results of less than 1ppm.

September/October 1994:

Soil and Groundwater sampling was requested in September of 1994. Sample analysis indicated low levels of lead, cadmium, and chromium. A number of collected soil samples exceeded the MCL of 10 mg/Kg for TRPH. Groundwater samples yielded exceedances of the MCL for aluminum, 0.2 mg/L, and iron, 0.3 mg/L.

3.6.1.2 Ransom Road Sandblast Yard Previous Investigations:

May 2000:

During May 2000, sampling was requested at the facility. The sampling site is located in an area that is east of the stormwater ditch running parallel to M6-1625 and south of the employee parking lot. Two samples were collected, one surface soil and the other at 2-ft bls. Both samples were below the screening criteria for PCBs.

February 1994:

In February 1994, a stockpile of sandblasting waste was sampled. The waste was stored next to the Ransom Road entrance gate on the east side of SR 3. The waste was supposed to be used for road maintenance. The stockpile measured 25 ft wide, 90 ft long and 3 ft high. Three samples were collected, for the west and east ends and the center of the stockpile. Samples were to be analyzed for total and TCLP metals and TRPH. Results indicated the concentrations of chromium, lead, and silver in all three samples; however there were no exceedances of screening criteria. Although there were not any exceedances of criteria, leachable constituents were detected in the TCLP analysis. Two of the three samples exceeded criteria for TRPH. It was concluded, based on the findings, that the stockpiles be removed from the site.

3.6.1.2 Ransom Road Sandblast Yard Previous Investigations (cont.):

April 1993:

In April 1993, sampling was requested from an abandoned septic tank at the facility. A water sample was collected from mid-depth of the septic tank. A single sludge sample was collected from the bottom of the tank. The samples were analyzed for metals, TCLP metals, specific gravity, total solids, SVOCs and VOCs. Concentrations for all analytes were below detection limits. The sludge sample yielded detections for chromium, mercury, lead, several SVOCs and VOCs. Analysis produced no exceedances of screening criteria.

Also occurring in April 1993, thirty-six locations were sampled using an OVA equipped with a FID from soil which was excavated for installation of a new conduit line. Four samples produced detections in excess 50ppm. Additional samples were collected from these sites and were analyzed for TCLP metals, PAHs, and VOCs. One exceedance of screening criteria was detected in one sample for lead, all other analytes were below detection limits.

February/March 1993:

During the months of February and March 1992, soil and groundwater sampling was requested at the facility. Results indicated the presence of VOCs and PAHs. The sample which produced the detections was collected within the containment structure for the AST, located on the southwest corner of the sandblast yard. Groundwater samples did not produce any exceedances of screening criteria for metals, PAHs, or TRPH.

October 1992:

In October 1992, eight soil samples were collected, following the footprint of the facility. The site was previously sampled for TCLP metals. Samples from each location surface, 1 ft, and 2 ft were mixed together and submitted as one composite sample. Results indicate that five of the eight lead concentrations exceeded screening criteria for metals. No other exceedances of criteria were noted.

July 1992:

In July 1992, three soil samples were collected and analyzed in the field with an OVA equipped with a FID. Samples from each location surface, 1 ft, and 2 ft were mixed together and submitted as one composite sample for TCLP metals analysis. There were several leachable metals detected, none of which exceed the regulatory limits.

February/March 1992:

During the months of February and March of 1992, forty-six surface soil and twenty-four 1 ft. to the groundwater table (4 ft) soil gas samples were collected. Soil gas measurements were collected using an OVA equipped with a FID. Analysis showed that areas in the southern section had elevated levels of volatile compounds. The detections indicative of potential contamination appeared at approximately 2 ft and increased with the soil depth. The location of most heavily contaminated samples coincided with historical storage areas of hazardous waste drums. The detections at the northern end of the site coincided with an area where wooden pallets were stored.

3.6.1.2 Ransom Road Sandblast Yard Previous Investigations (cont.):

December 1990:

During December 1990, a composite sample of sandblast material was submitted for TCLP metals analysis. All detections were below screening criteria.

3.6.1.3 Ransom Road Landfill Previous Investigations:

June/July 1996:

Sampling was requested at the facility the data collected indicates no volatile organic compounds were detected in samples collected from 40 and 63 ft bls, but four organic compounds were detected in the sample collected from 17 ft. bls. Three of these compounds met or exceeded their respective groundwater criteria.

July 1995:

The analysis of the groundwater samples collected produced exceedances for lead, iron, and TDS. Five samples exceeded criteria for benzene, and two samples exceeded criteria for vinyl chloride.

3.6.1.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations

December 1995:

On December 21, 1995, STP-11 was removed from service at STDNS. The STP was removed due to the high cost of splitting and refurbishing the existing percolation/evaporation pond as required by FAC 62-610. The replacement of STP-11 with a lift station was part of a regionalization of the KSC domestic wastewater systems.

September 1995:

In September 1995 a Preliminary Assessment (PA) of the Generator Shop, M5-1544, was conducted by ESPC. The assessment was conducted to determine if historical operations at the facility may have impacted the soils, groundwater, and surface waters adjacent to the facility. Groundwater was sampled from five locations, soil samples from four locations and one surface water sample was collected. The samples were initially screened by the Environmental Health Field Screening Laboratory. Anomalies, if found were submitted to the sub-contract laboratory for analysis for SVOCs, VOCs, total metals and TRPH.

Laboratory analysis indicated the soils contained no detectable concentrations of VOCs. Di-n-butylphthalate was detected from a background location 350 ft north of the generator shop, and TRPH was detected from the location of the 250 gallon waste oil AST. The metal concentrations detected in the soil samples were consistent with KSC background soils. Groundwater analyses indicated no detectable concentrations of VOCs at any of the sample locations. The analytical results for metals indicated metal concentrations from the samples collected were within the background conditions at KSC, with the exception of aluminum, iron, and manganese which exceeded GCTLs. Surface water analyses indicated no concentrations above screening criteria.

3.6.1.4 STDNS Previous Investigations (cont.)

May 1992:

In May 1992 ESPC employees supported the construction of four monitoring wells around the construction of an AST containment area. Readings using an OVA equipped with a FID were conducted at the head space of the four wells, and the concentrations of organic vapors were all less than the FDEP target levels of 50 ppm.

June/July 1991:

Beginning in June of 1991, soil and groundwater samples were collected from the area surrounding a 25,000 gallon AST. Soil samples were collected from eight locations, and groundwater samples were collected from five of the soil sample locations. The soil was collected at one-foot intervals until reaching the capillary fringe and screened with an OVA. A representative soil sample was collected just above the capillary fringe and submitted for laboratory TCLP analysis. Groundwater samples were collected and submitted for laboratory analysis for PAHs, VOAs, Ethylene Dibromide (EDB), and Methyl Tert-Butyl Ether (MTBE)

The OVA results, for the soil samples collected ranged from 0 to >800 ppm. Excessively contaminated soil was encountered at each sampling location, with the highest concentrations detected between the depths of 3 and 6 ft bls. The laboratory results for the soil sample analyzed for TCLP indicated no exceedances. The groundwater analytical data indicated exceedances of screening criteria for 1-methylnaphthalene, 2-methylnaphthalene, total hydrocarbons, benzene, ethylbenzene, naphthalene, and phenanthrene.

May 1990:

The oldest investigation was conducted on May 12, 1990, by ESPC. The request was to sample soil from the area surrounding the 25,000 gallon AST, and the areas surrounding Antenna's #1, and #2. The sampling was conducted due to concerns of possible contamination from diesel fuel, and from paint chips from the sand-blasting and refurbishment of Antenna's #1, and #2.

Six soil samples were collected from around the AST area. Twelve field samples utilizing an OVA equipped with a FID were collected. The twelve OVA samples were collected at depths of 1ft, 2 ft, 3 ft, and 4 ft bls from four locations, soil samples were collected at the 4 ft bls. The OVA results from the 1ft bls samples ranged from 0 to 390 parts per million (ppm), 3 ft bls sample collected around the AST ranged from 0 to 220 ppm, 6 ft bls sample collected around the AST ranged from 0 to 106 ppm. All samples collected on the east and south side of the AST indicated excessively contaminated soil (>50 ppm OVA per Ch. 62-770, FAC). OVA detections from the other two locations did not exceed 2 ppm.

Soil samples analyzed for metals, cyanide, sulfide, and ignitability. Paint chip samples were also collected from the antennas. Review of the laboratory results indicate that all parameters were reported as less than the method detection limits.

3.6.1.5 Jerome Road Agricultural Shed Previous Investigations:

February 1995:

On February 8, 1995 groundwater sampling was performed by ESPC to confirm the findings from the April 28, 1993 sampling event. Two depths from two separate locations at the JRASA were sampled then analyzed for metals, volatile organics, pesticides, and herbicides. The first location was located on the west side of the shed near the surface water drainage ditch. The second location was located south of the facility directly under a large AST. The ESPC report stated laboratory analyses of the groundwater samples collected indicated all parameters tested for were below regulatory criteria.

June 1993:

On June 16, 1993, ESPC conducted a quarterly hazardous waste inspection of USFWS facilities at KSC. The ESPC report states the JRASA has several old ASTs on-site. In addition the report states chemicals stored in the shed were removed on June 18, and 19, 1993 and sent to an off-site operation center for the grove operator.

April 1993:

On April 28, 1993 groundwater samples were collected from four locations, one on each side of the shed. Groundwater samples were analyzed for total metals, solvents, TRPHs, PAHs, pesticides and herbicides. The report states laboratory analyses for groundwater samples indicated that the analytes below laboratory detection limits.

March/April 1993

The first investigation began on March 29, 1993, at the request of NASA/KSC Environmental Management Office (EMO). The request to sample soil and groundwater was made based on the past usage and visual inspection of the JRASA by the EMO. Composite soil samples were collected from the shed floor, the outside perimeter of the shed, and a ditch which receives run-off water on the west boundary of the JRASA. Soil samples were analyzed for total metals, solvents, total recoverable petroleum hydrocarbons (TRPHs), polynuclear aromatic hydrocarbons (PAHs), pesticides and herbicides.

The laboratory analytical reports were not available for review during this investigation; however, the ESPC report states analytical results of the composite soil samples indicated concentrations of arsenic, mercury, chromium, and lead were detected. Based on these findings ESPC requested the laboratory to run Toxicity Characteristic Leaching Procedure (TCLP) analyses for these metals. The results of those analyses indicated no exceedances.

3.6.2 Other Adjacent Property Environmental Investigations

A review of NASA Remediation projects files contained contamination investigations of the various properties, adjacent to the ISRP site. Contractors which preformed the investigations will be identified with the investigation discussions.

3.6.2.1 Ransom Road Sandblast Yard Pervious Investigations:

In March 1996, HSW conducted surface water and sediment sampling in the ditches surrounding the GSA as part of the RFI Investigation of RRSA during 1996 and 1997. Fourteen sediment and thirteen surface water samples were collected and analyzed for pesticides and TAL metals. Some of the samples were also analyzed for VOCs and SVOCs. Selected surface water samples were filtered with a 0.45 micron filter to analyze dissolved (filtered) metals. PCBs were detected at concentrations exceeding criteria in all but two of the sediment samples. The highest PCB value was 4.8mg/Kg at SED-17. No point source of PCBs was identified. Various pesticides were detected in the sediment samples at levels exceeding the screening criteria values. Metals were also detected above screening values. The pesticide, 4,4-DDT, was detected in one surface water sample, SW-17. Several metals were detected in concentrations exceeding screening criteria. In 1999, the drainage ditches surrounding GSA and RRSA were excavated in June 1999 as part of an approved Interim Corrective Measure (ICM).

3.6.2.2 Ransom Road Reclamation Yard Previous Investigations:

Beginning in April 1990 the initial facility investigation was conducted by BOC using piezocone, hydrocone and DPT testing methods. Piezocone tests were used to identify lithology to 70 ft. bls. Hydrocone samples were collected to a depth of 36 ft bls, and DPT wells were installed to a depth of 10 ft. bls. Laboratory analysis of the groundwater indicated the presence of benzene, dichlorobenzene, and chlorobenzene above screening criteria.

September 1990, Phase II of the investigation conducted by the BOC which consisted of surveying direct push wells, taking depth to water measurements, and sample collection consisting of surface and capillary fringe soil and surface water.

Commencing in March 1999 and concluding in February of 2001, HSW Engineering conducted an RFI Instigation of the Reclamation Yard. The following text is a summary of the HSW RFI investigation.

Two groundwater plumes were found underling the facility. One plume begins on the western side of the facility and extends to the eastern corner of the Ransom Road Reclamation Yard, West. The second plume begins on the northeast corner of the facility and extends north/northwest near the eastern most retention pond.

The western plume consists mainly of chloroethenes. The suspected source of the plume is thought to originate in the southwestern corner of the facility. The second plume, located on the northeastern side of the facility consists mainly of chlorobenzenes, pesticides, and PCBs.

3.6.2.2 Ransom Road Reclamation Yard Previous Investigations (cont.):

Soil analysis detected several compounds above residential screening values, however; as that function of the facility is for industrial purposes, exceedances of only the residential values were not considered to be critical. Benzene exceeded leaching criteria in two locations near the west/northwest side of the property, and pentachlorophenol exceeded leaching criteria on the northeast side of the property. Mercury exceeded leaching criteria near the southwest corner of the site. Exceedances did not demonstrate a clear pattern of contamination. Pesticides exceeded both leaching and industrial criteria along the west, east, and northeast areas of the facility. PCBs exceeded both leaching and industrial criteria along the eastern side and northeastern corner of the facility. The highest concentrations occurring at the northeastern corner along the fence line. It is suspected this may be the source of the ground water contamination.

No VOCs or metals were reported above the screening criteria in the sediment. Pesticides and PCBs exceeded the screening criteria in both retention ponds and northern drainage ditches. It is believed that the accumulation of contaminants in the sediments are from runoff from the northeastern corner of the property. Vinyl Chloride (VC) was detected above screening criteria in the drainage ditch on the north side of Ransom Road. One pesticide was detected in the drainage pond. No metals were detected above the screening criteria.

An elevated ecological risk was assessed for the facility. Future plans for remediation at the site will address any ecological impacts that this site imposes.

3.6.2.3 Ransom Road Landfill Previous Investigations:

An investigation of the groundwater quality was begun in April 1984 and final findings were submitted by Clark Engineers-Scientists in December of 1986. Data collected indicated exceedances of screening criteria. As a result of the groundwater findings NASA implemented an RFI. The RFI was completed in April 1997 and a Statement of Basis submitted to the regulatory agencies, which requested additional groundwater sampling.

Findings from the Clark Study indicated the groundwater contamination exists at the site due to leachate generation from the closed landfill. A leachate plume was detected at the site. Elevated concentrations of ammonia, benzene, chlorobenzenes, chloroform, DCE, TCE, and VC were detected.

The 2001 RFI of the closed landfill was conducted by HSW. Sampling consisted of a groundwater investigation. Sampling was conducted in three phases during the year: Phase I consisted of monitoring well sampling, Phase II monitoring well and DPT sampling, and Phase III of DPT sampling only. VOCs, specially TCE, DCE, and VC and ammonia were detected in the groundwater samples collected at the southern end of the landfill. This location remains under longer term monitoring with land use controls in place.

3.6.2.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations (cont.)

A soil vapor survey was conducted from the area surrounding the 25,000 gallon diesel AST on January 8, 1992 by Applied Earth Sciences (AES). Soil was collected at one foot intervals from nine locations surrounding the AST. An OVA equipped with an FID was used to screen the soil samples. Groundwater was encountered between 2 ft bls and 5 ft bls at the nine sampling locations. The highest OVA readings were recorded from the location near the southwestern corner of the AST.

From August to September 1995, a PCAR was performed on a 250 gallon UST used for the storage of used oil located at the southeast corner of the Generator Shop (M5-1444). The report was prepared by U.S. Environmental Group, Inc.

Tank closure activities were initiated on August 14, 1995. The tank and associated piping was located underneath a concrete hold down slab. Upon removal of the hold down slab, the piping associated with the tank was disconnected, drained into the tank and capped at the east wall of the building. The oil remaining in the tank was removed using an air driven pump and contained on-site in a 55-gallon drum. The tank was then cleaned with a pressure washer and wastewater from the cleaning process was stored in two 55-gallon drums. The excavation was then back-filled with approved fill material.

As part of the closure assessment a soil boring was made on each side of the tank. Soil samples were collected at two foot intervals to a total depth of six ft bls from each of the borings and sampled using an OVA. No visible staining was observed in the soil from around the tank and excessively contaminated soil and OVA analysis did not detect any organic vapors.

A temporary monitoring well was installed in the center of the former tank location on August 28, 1995. The well was installed to a total depth of 7.4 ft bls, with 0.010 slotted screen from 2.4 ft to 7.4 ft bls. The water table was encountered at approximately 5 ft bls. Groundwater was sampled from the well and analyzed for Priority Pollutants Volatile Organics, Priority Pollutants Extractable Organics, and Arsenic, Cadmium, Chromium, and Lead on August 31, 1995. Laboratory analytical results indicated no current exceedances were reported for the groundwater sample.

From August to January 1996 a PCAR was performed on a 6,000 gallon UST abandoned in place east of the OSB. The report was prepared by U.S. Environmental Group, Inc.

3.6.2.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations (cont.)

Tank closure activities were initiated in August of 1995. A concrete hold down pad was removed from over the UST and the piping was re-plumbed to the 25,000 gallon AST at the Generator Shop. Launch schedules delayed the removal of the UST until November 28, 1995. At this time soils surrounding the tank were excavated and stockpiled. The tank was cut open and the fill material was removed and also stockpiled on-site for future removal. The UST was removed from the ground and triple rinsed with a pressure washer. The water used to clean the tank was removed during the cleaning process and stored in eight 55-gallon drums for disposal by BOC-WMA. 104.47 tons of excessively contaminated soil was removed from the site for thermal treatment by Soil Treatment Services (STS). The concrete hold down pad was removed to the KSC landfill. The excavation pit was back-filled with approved fill material, and then compacted.

Soil assessment was included as part of the closure assessment. Soil samples were collected from all sides of the excavation and at a depth of 2 feet below the piping. The soil was screened using an OVA. The soil screening revealed excessively contaminated soil between 2ft and 6ft bls from the tank pit. The composite soil sample was collected on June 20, 1995 to provide a disposal profile. The sample was analyzed for SVOCs, VOAs, PAHs, Total Recoverable Petroleum Hydrocarbons (TRPH), and for 8 RCRA Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Analytical results from the soil sample collected indicated TRPH exceeded the SCTL. Lead, chromium and mercury concentrations exceeded EPA Region IV Ecological values.

A temporary well used to evaluate groundwater was installed at the center of the former tank location on December 11, 1995. The well was installed to a total depth of 12.45 ft bls, with 0.010 slotted screen from 2.45 ft to 12.45 ft bls. The water table was encountered at approximately 6 ft bls. Groundwater was sampled from the well and analyzed for VOAs and PAHs on December 14, 1995. Laboratory analytical results indicated no exceedances were reported for the groundwater sample.

A Petroleum Contamination Assessment Report (PCAR) was performed in April 1997 by Universal ES for OSB (M5-1494). The consensus was to take seven soil borings around the perimeter of the former 6,000 gallon UST to determine soil quality.

Soil was sampled from 12 locations in and around the former tank location at the depths of 2 ft, 4 ft, and 6 ft bls. One boring (boring 7) yielded an OVA response of 56 ppm at a depth of 4 ft bls. No other readings above 50 ppm were recorded from any other depths from the sampling locations.

4.0 ISRP pROPOSED sAMPLING Locations

Thirteen proposed sampling locations (PSLs) were identified at the ISRP site and are displayed on Figure 5. Soil PSLs were chosen as random representative areas of active citrus groves. Groundwater PSLs were chosen to identify impacts, if any, from the surrounding SMWU sites. Surface water and sediment PSLs were chosen to identify any potential site impacts from runoff. Exact sampling locations, with an accuracy of 3 to 5 meters, will be provided as GPS coordinates in the final report. The following provides a summary of each location and potential contaminants.

4.1 PSL 1:

A diesel tank was reported once located at this location. The tank was reportedly replaced with a mineral oil tank, which was removed in 2002. Currently, only a concrete containment area remains at this location. A soil sample is proposed for the containment area. Surface water and a sediment samples are proposed for the surface water body.

4.2 PSL 2:

This location is located in the North West of PSL 1. The surface water body runs parallel to Space Commerce Way. Proposed sampling includes surface water and sediment samples.

4.3 PSL 3:

This location is located to the South of PSL 2 and South West of PSL 1. Proposed sampling includes surface water and sediment samples.

4.4 PSL 4:

This location is located approximately 920 feet into the eastern property boundary and 1,500 feet north of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. Proposed sampling is for a single surface soil sample.

4.5 PSL 5:

This location is located approximately 1000 feet into the eastern property boundary and 1000 feet to north of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. Proposed sampling is for a single surface soil sample.

4.6 PSL 6:

This location is located approximately 350 feet into the eastern property boundary and 250 feet north of Ransom Road. This location was chosen to determine impacts, if any, from the SWMU/PRL locations directly to the east. Proposed sampling is for a single groundwater sample by Direct Push Technology (DPT)..

4.7 PSL 7:

This location is located approximately 230 feet into the western property boundary and approximately 230 feet north of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. Proposed sampling is for a single surface soil sample.

4.8 PSL 8:

This location is located approximately 250 feet into the eastern property boundary and approximately 250 feet south of Ransom Road. Proposed sampling includes a surface soil and DPT samples. This location was randomly chosen to determine impacts, if any, from the SWMU/PRL locations directly to the east.

4.9 PSL 9:

This location is Pump House 6. Pump House 6 is located approximately 230 feet into the western property boundary and down approximately 1000 feet south of Ransom Road. Proposed sampling includes a surface soil and DPT sample to be collected at the Pump House, which has an affiliated diesel tank, and has been the location of numerous environmental contamination investigations. Collection of surface water and sediment samples are proposed, at the Pump House culvert.

4.10 PSL 10:

This location is located approximately 500 feet into the eastern property boundary and approximately 1,400 feet south of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. Proposed sampling is for a single surface soil sample.

4.11 PSL 11:

This location is located approximately 700 feet into the eastern property boundary and approximately 1,400 feet south of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. Proposed sampling is for a single surface soil sample.

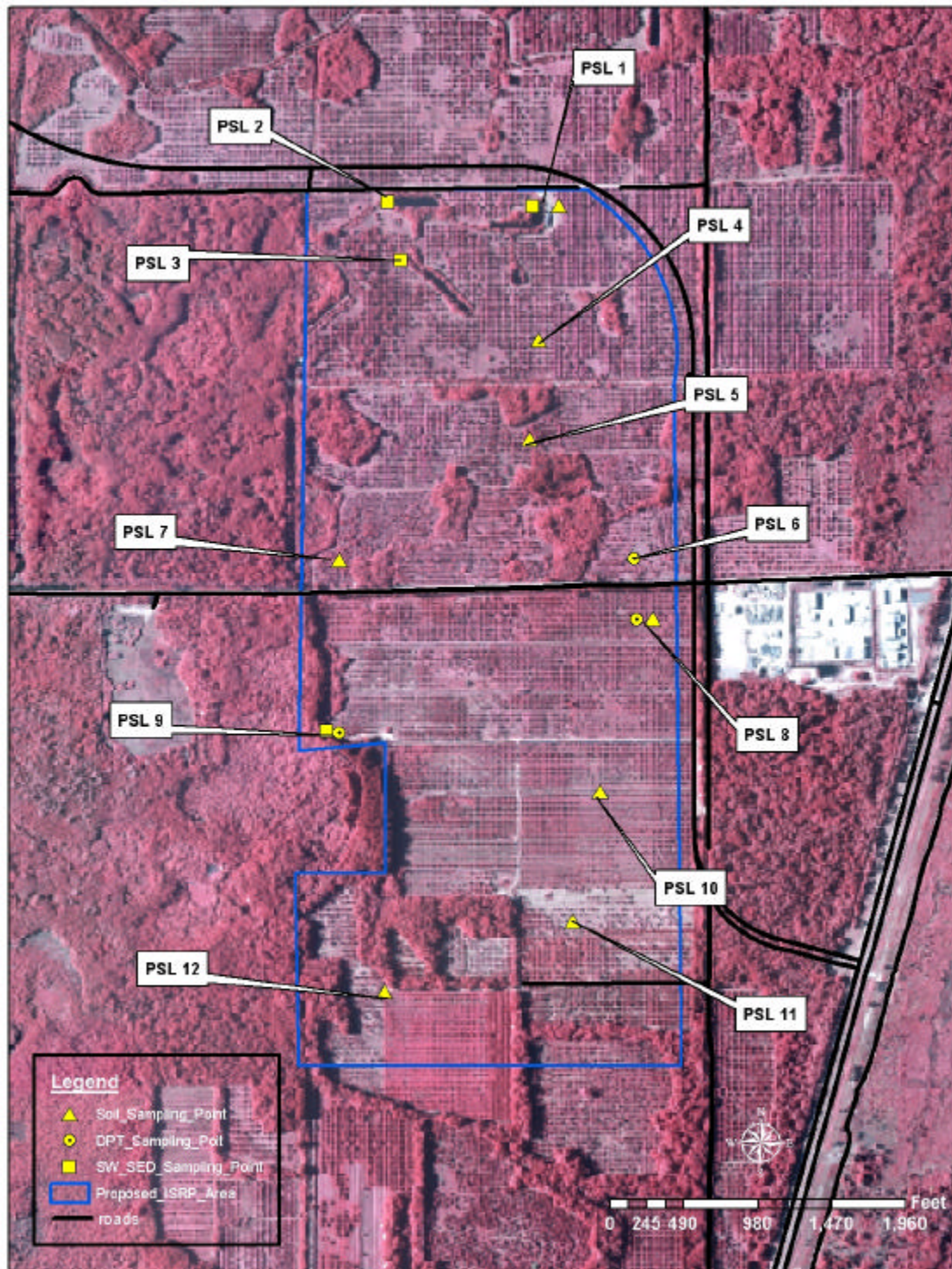
4.12 PSL 12:

This location is located approximately 500 feet into the western property boundary on and approximately 2,500 feet south of Ransom Road. This location was chosen to determine groundwater impacts, if any, from the Ransom Road Landfill SWMU location to the North West of the site. Proposed sampling is for a groundwater sample.

5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Conclusions of this environmental site assessment of the ISRP area are based on information from data collected during this Phase I Environmental Site Assessment, previous environmental investigations at the site, and information collected during SWMU investigations at environmentally impacted sites which surround the ISRP site. The results of this assessment indicate that citrus grove operations at the ISRP site may not have negatively impacted the environment in the area, but the ISRP site may have been impacted from the surrounding SWMU/PRL locations. Phase II sampling is recommended, at the proposed locations, to verify that no negative environmental impacts have occurred at this location and that impacts from surrounding SWMU sites are minimal. A sampling plan for the ISRP site has been prepared and submitted with this report.

Figure 5. ISRP Proposed Sampling Location Site Map



5.1 Summary and Conclusions

Conclusions were made based on review of current and previous environmental investigations of the ISRP area. Quarterly sampling reports, dating back until 1997, and three environmental investigations, of Pump House 6, twenty-eight environmental reports of the surrounding SWMU/PRL sites were reviewed during this investigation. Ten personal interviews were conducted during the investigation concerning current and historical issues involving the ISRP site. Twelve areas at the ISRP site were identified as suggested sampling locations. Each of the areas identified, as PSLs in this report have been described as to location. Sampling of suggested environmental media at each of these locations with analyses for the identified potential contaminants is necessary to determine the presence or absence of contamination at the ISRP site. A sampling plan for the ISRP site has been prepared and submitted with this report.

5.2 Recommendations

Phase II sampling is recommended at the ISRP and a sampling plan for the site prepared and submitted. Sampling and analyses of environmental media should include, at a minimum, each of the locations and contaminants identified in this report.

REFERENCES

1. Dynamac Corporation, June 2002. Protected Wildlife Species List, Kennedy Space Center.
2. Edward E. Clark Engineer-Scientists, Inc, November 1995. KSC Groundwater Survey the Site Specific Program.
3. Edward E. Clark Engineer-Scientists, Inc, January 1997. KSC Subsurface Hydrology and Groundwater Survey Volume III CERCLA Remedial Investigations.
4. HSW Environmental Group, October 2001. RCRA Facility Investigation Report for the General Services Administration Reclamation Yard (SWMU #10).
5. HSW Environmental Group, March 1998. RCRA Facility Investigation Report for the Ransom Road Sandblast Area (SWMU #).
6. HSW Environmental Group, December 2001. RCRA Facility Investigation Addendum/Long Term Monitoring Work Plan for the Ransom Road Landfill (SWMU #3)
7. HSW Environmental Group, December 2001. Year 1 Annual Long Term Monitoring Report for January, July and December 2002 Semi-Annual Sampling Events at Ransom Road Landfill (SWMU #3), Kennedy Space Center, Florida.
8. J-BOSC Environmental Health and Services, January 2003. Spaceflight Tracking and Data Network Station (STDNS), Kennedy Space Center, Florida, SWMU Assessment Report, PRL #73 (Revision 1).
9. J-BOSC Environmental Health and Services, July 2002. Group Two Jerome Road Agricultural Shed Area (JRASA) N6-0065, Kennedy Space Center, Florida, SWMU Assessment Report, PRL #57b (Revision 0).
10. Paul A. Schmalzer et al, Dynamac Corporation, June 2000. Background Chemical and Physical Characteristics report. Kennedy Space Center, Florida.
11. NASA, February 2002. Screening Criteria Tables. Generic Document for RCRA Facility Investigations at Kennedy Space Center Florida and Cape Canaveral Air Station, Florida.
12. St. John's River Water Management District. 1995. Florida Land Use Classification Codes (FLUCCS).
13. USGS, 1976, Courtenay Quadrangle Map, 7.5' Series.

Appendix A

List of Interviewed Personnel

Kerr Foundation for Sustainable Agriculture, Robert Adair, (772) 562-3802

J-BOSC Corrosion Control, Systems Engineer, Robert (Bob) Perrsons, (321) 867-4541

J-BOSC Environmental Health, EC&PH Section, D. Keith Johnston, (321) 867-3593

J-BOSC Environmental Health, EC&PH Section, E. Daniel Sciarini, (321) 867-3557

J-BOSC Environmental Health, EC&PH Section, John Williams, (321) 867-3619

GSA Reclamation Yard and GSA Reclamation Yard, West, Facility Manager, Dave Koval,
(321) 867-4137

GSA Reclamation Yard and GSA Reclamation Yard, West, Property Disposal Officer,
Pauletta Mc Guinness, (321) 867-7027

NASA, Environmental Program Office, Douglas Durham, 867-8429

NASA, Real Property, Leila Taylor, (321) 867-8492

United States Fish and Wildlife Services, Administrative Forester, Frederic (Fred) W.
Adrian, (321) 861-6694

Appendix B

Citrus Grove Lease Agreement

SEP 22 '83 13:04 FR

4078611276 TO 73694

P.02

MEMORANDUM OF UNDERSTANDING

BETWEEN

U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE

AND

THE KERR CENTER FOR SUSTAINABLE AGRICULTURE, INC.

I. AUTHORITY

This Memorandum of Understanding lasting for ten (10) years between the U.S. Department of Interior, Fish and Wildlife Service (hereafter referred to as the "Service") and the Kerr Center for Sustainable Agriculture (hereafter referred to as the "Center") is hereby entered into pursuant to Section 1 of the Fish and Wildlife Service Coordination Act, 16 U.S.C. 661, and Section 7 of the Fish and Wildlife Act of 1956, 16 U.S.C., 742 f(a) (4). This document supersedes the Memorandum of Understanding between the Service and the Center numbered 1448-004-96-908.

II. BACKGROUND

By virtue of the agreement between the Service and the National Aeronautics and Space Administration, dated February 7, 1963, the Service is responsible for the operation of the citrus groves on Merritt Island National Wildlife Refuge (MINWR), and it desires to reduce the chemical and other inputs to the citrus operations on the refuge.

Over the last several years, the groves have not been economically viable for commercial citrus operations. For a period of time, during 1996 and 1997, groups 1, 3, 4 and 5 were managed by the Kennedy Space Center (KSC). This arrangement did not prove to be feasible, and the groves were returned to the Refuge under the above agreement. Due to the present economic conditions, and the poor condition of the groves, it is the decision of the Refuge that all the groups, including Group 2, should be assessed to determine their agronomic and economic viability. Only the portion of the groves that is viable will remain in operation. The remainder will be eventually converted to native vegetation, or utilized by Kennedy Space Center for facilities.

III. PURPOSE

The Service and the Center recognize that a sustainable agricultural approach to citrus management will reduce deleterious inputs, and it has been determined that

SEP 22 '03 13:04 FR

4078611276 TO 73694

P.03

2

there is a need to test the economic and cultural feasibility of a sustainable agricultural approach to the citrus groves on the MINWR at an operational scale. The viable MINWR groves have the potential to be a suitable area to test such feasibility.

There remains a current need to continue and expand knowledge and distribution of knowledge of low input and sustainable citrus culture. The Center is recognized as having knowledge and expertise in the area of developing and implementing plans for a Sustainable Citrus Program (SCP) that incorporate the principles of low input applications, IPM, and sustainable agricultural practices for citrus culture.

The operation of the refuge citrus groves should be based on sound environmental principles. The cooperators desire to work together to expedite the development of a SCP based on environmentally sound management plans for these groves.

IV. SCOPE OF WORK

In the consideration of the promises and mutual covenants herein contained, the parties hereby agree as follows:

A. The Center agrees to:

1. Assist the Service in determining which citrus groves have the best potential for viable citrus production.
2. Develop and implement the SCP for all of the viable citrus groves on MINWR that makes use of their current knowledge of low input, sustainable citrus culture. This program shall include provisions for citrus care including fertilization, pest control, weed control and other appropriate sustainable citrus horticultural practices.
3. Provide for a suitable caretaker to carry out the grove operations in accordance with the fore mentioned program.
4. Assist in the development of a SCP label for marketing the sustainable citrus products through Spaceport USA and/or other outlets.
5. To abide by the Service requirements as they apply to the application of pesticides and other chemicals.
6. Provide the Service with proof that the SCP caretaker will provide bonds or other suitable financial instruments for the period of the MOU.

SEP 22 '03 13:05 FR

4078611276 TO 73694

P.04

3

7. Provide the Service with an annual plan outlining grove caretaking practices that will be used.

8. Maintain records detailing the economic aspects of the operation of the SCP.

9. Provide annual and final reports including the agronomics, economics, and environmental details associated with the SCP. These reports shall be delivered to the refuge by November 1 of each year. The economic reports will be used to determine, in part, the occurrence of unspent funds as defined in Section C-1.

10. Receive funds from KSC obtained from previous sales of fruit from the Refuge groves and from the Caretakers derived from a percentage of the sales of fruit. The Center will use these funds to defray both the direct and indirect costs associated with the development and implementation of the SCP at the MINWR by the Center or their Contractors or any of their officers, agents, or employees. These costs would include but not be limited to the following:

- i. All administrative, management, and research costs
- ii. Purchase of equipment and/or machinery costs
- iii. Purchase of agronomic materials for the SCP at the MINWR groves.
- iv. Capital improvements for the MINWR groves, such as: machine work, tree removal, replanting citrus trees, drainage improvements, pump operations etc.
- v. Defray expenses for developing a SCP label.
- vi. All other costs incurred by the Center pertaining to the implementation of the provisions of Section A.

11. Provide to the Service annually, a complete and itemized accounting report prepared by the Center containing all costs associated with the implementation of the SCP at the MINWR groves. This accounting report may be subject to an outside audit by the Service at their expense.

12. Assist in seeking other partners for the experimental operation of the Refuge groves.

B. The Service agrees to:

1. Provide the citrus groves for the implementation of said plans.
2. Obtain access to the NASA security areas as needed by the Center employees.

SEP 22 '03 13:05 FR

4078611276 TO 73694

P.05

4

3. Seek assistance from NASA and other partners in obtaining and analyzing surface and ground water, soil samples and other samples.
4. Assist in determining the feasibility of retailing citrus through Spaceport USA.
5. Provide technical assistance, through Service contaminants and pesticide specialists, as to the fate of inputs applied to the citrus groves in the overall ecosystem.

C. It is Mutually Understood and Agreed:

1. Funds remaining after payment of allowable costs as listed in A-10, i-vi shall be treated as unspent funds.
2. Upon either the completion of the Period of Performance (Section V.) or early termination of this MOU (Section VI), the Center will return all unspent funds the Service.
3. A special marketing label for the citrus products grown under sustainable citrus culture program may be developed by the Center and made available for products certified by the Center.
4. Knowledge and techniques for sustainable citrus culture derived from the activities on MINWR will be made available to other citrus interests through field day demonstrations, publications or any other method deemed suitable.

V. PERIOD OF PERFORMANCE

The period of caretaking performance of this MOU shall be from June 1, 1998 through January 15, 2008. The Center shall have harvesting rights until July 31, 2008. The Service has no plans to continue citrus grove operation after this time.

VI. SPECIAL TERMS AND CONDITIONS

- A. All conditions and provisions of this MOU shall become effective upon final signature of both parties and shall remain in force for TEN years unless terminated by either party upon 180 days written notice.
- B. This MOU constitutes the full, complete and entire agreement between the parties. No modification of this agreement shall be binding on either party unless such modification shall be in writing, executed in duplicate by both parties, attached herewith, and incorporated in and by reference made a part of this MOU.

SEP 22 '03 13:05 FR

4878611276 TO 73694

P.06

5

- C. The Service's liability will be governed by the Federal Tort Claims Act (28 U.S.C) 2761 et seq.). The extent to the Center's liability shall be governed by the laws of the State of Florida.

IN WITNESS WHEREOF, the Service and the Center have made and entered into this Memorandum of Understanding on the date and year set forth below their signature.

U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE

THE KERR CENTER FOR
SUSTAINABLE AGRICULTURE, INC.

BY: Ron Hight

BY: Robert L. Olney

TITLE: Refuge Manager

TITLE: Exec. Director, Kerr Center

DATE: June 9, 1998

DATE: June 9, 1998

Appendix C

Citrus Grove Tank Closure Report

SEP 22 '03 13:06 FR

4078611276 TO 73694

P.12



Oxy-Cat™

ABOVEGROUND STORAGE TANK CLOSURE REPORT

Merritt Island National Wildlife Refuge
Grove Road and Space Commerce Way

November 11, 2002

Project No. 02022

Prepared for:

Merritt Island National Wildlife Refuge
PO Box 6504
Titusville, Florida
32782

Prepared By:

Asset Recovery Group, Inc.
2140 W. King Street
Cocoa, Florida 32926

SEP 22 '03 13:07 FR

4278611276 TO 73694

P.13

Merritt Island National Wildlife Refuge- AST Closure Report
Asset Recovery Group, Inc.
Project Number 02022

TANK CLOSURE REPORT

Facility: Merritt Island National Wildlife Refuge
Grove Road and Space Commerce Way

FDEP Facility No: 059802030

Owner: Merritt Island National Wildlife Refuge
PO Box 6504
Titusville, Florida 32782

Date Inspected: 8/15/02

ARG Representative: Jim Carey

Tanks Closed: Tank # 1 - 8,000 gallon petroleum based crop oil

Tank Condition: The tank was located on a concrete slab within a concrete block containment area. The containment area was covered with a tin roof. The tank appeared to be in excellent condition. There was no sign of discharge within the containment area.

Excavation Area: NA

Depth To Water: Approximately 5 feet.

Soil Screening: Soils samples were obtained on October 30, 2002 during a site investigation. This activity was conducted after removal of the aboveground storage tank. Soil samples were collected at each corner of the containment structure, along the edge of the containment structure, and at the north end where the dispenser was located. Soil samples were screened with an Organic Vapor Analyzer (OVA) equipped with a flame-ionization device (FID) in accordance with Florida Department of Environmental Protection (FDEP) Chapter 62-770.200 FAC. The soil samples were placed in jars with an aluminum foil seal placed over each jar. Each jar was screened by inserting the tip of the OVA through the aluminum foil seal. For those samples that exhibited an OVA response greater than ten (10) ppm, the second jar was screened using an activated carbon filter. The filtered reading was then subtracted from the unfiltered sample to obtain the total petroleum hydrocarbon reading.

SEP 22 '03 13:07 FR

4078611276 TO 73694

P.14

Mentit Island National Wildlife Refuge- AST Closure Report
Asset Recovery Group, Inc.
Project Number 02022

OVA Readings: No soil sample displayed a reading above 2 parts per million (ppm) during the soil screening process. The location of the soil samples can be seen in **Figure 1. Table 1.0, Attachment A** contains a summary of the soil screening survey OVA results.

Soil Lab Results: Soil screening did not identify any impacted soils, and there was no visible evidence of impacted soils. Therefore, one confirmatory soil sample was collected from the north end of the containment area where the contents of the tank were dispensed. The soil sample (SB-7) was submitted to an independent laboratory for analyses of adsorbed phase hydrocarbons by EPA Test Method 8021B (BTEX+MTBE), EPA Test Method 8310 (polynuclear aromatic hydrocarbon) and FL-Pro (Total Petroleum Hydrocarbons (TPH)).

The laboratory analysis of the soil sample reported that all compounds reported by EPA Test Method 8021B, and EPA Test Method 8310 were below Method Detection Limits. Results of the FL-PRO analysis revealed a concentration of 9.6 milligrams per kilogram (mg/Kg). However, this is significantly less than the 340 mg/Kg cleanup goal established in Table V of Chapter 62-777 for Resource Protection/Recovery. A copy of the FDEP Closure Assessment Form is contained in **Attachment B**. A copy of the laboratory report is contained in **Attachment C**.

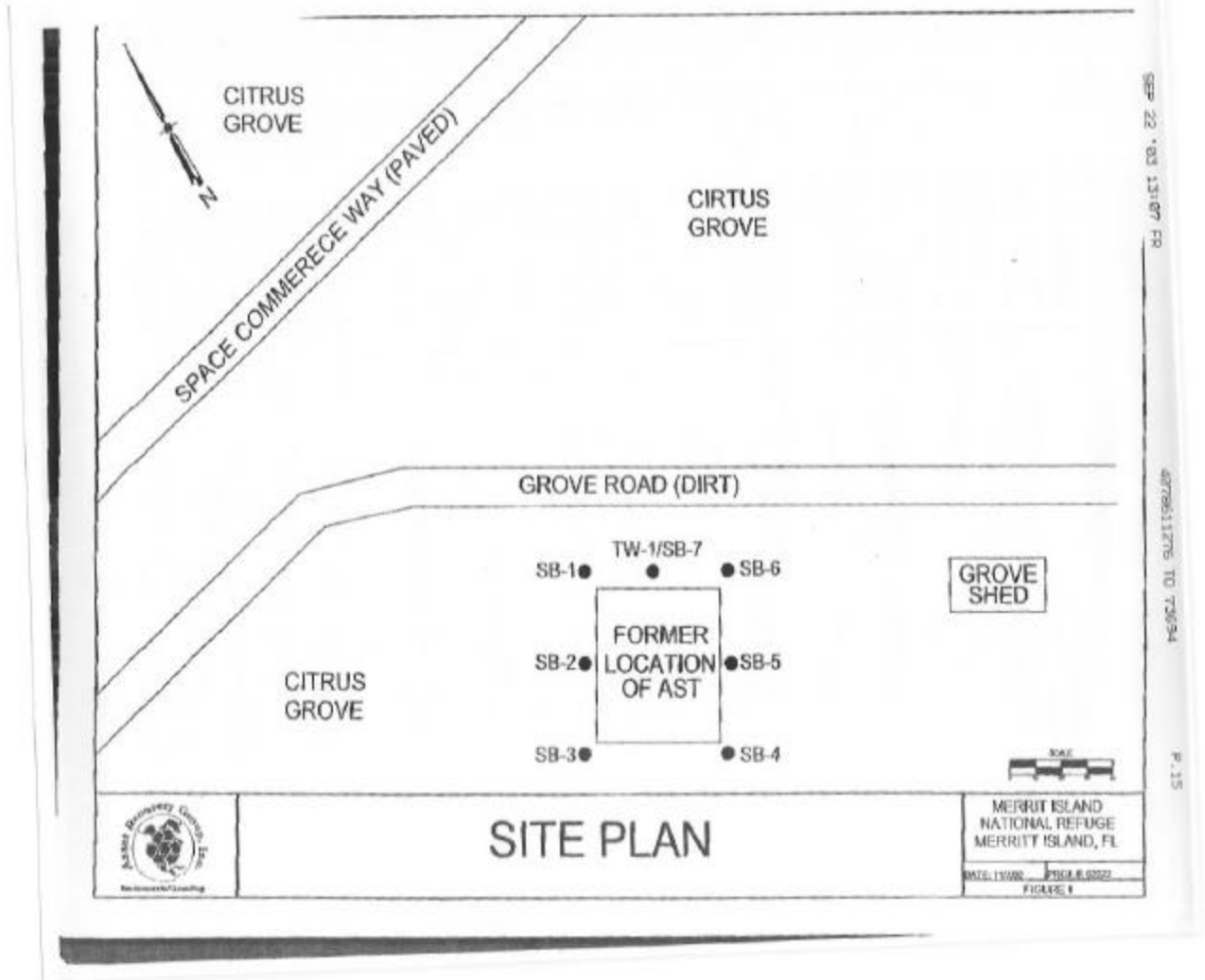
Groundwater Sampling: One Groundwater sample was collected from a temporary well installed into the groundwater at the north end of the containment structure where product was dispensed from the tank. A photograph showing the location of the temporary well is provided in **Attachment D**.

Groundwater Quality: The laboratory analysis of the groundwater sample reported that all compounds reported by EPA Test Method 8021B, EPA Test Method 8310, and FL-PRO were below Method Detection Limits. A copy of the laboratory report is contained in **Appendix C**.

Conclusion: The data collected during this investigation indicate that soils and groundwater have not become impacted with petroleum products during operation of this petroleum storage system.

Recommendations: Based on the findings of this investigation, Asset Recovery Group recommends that a decision for No Further Action be issued for this site.


James S. Carey, P.E.
Asset Recovery Group, Inc.



SEP 22 '03 13:07 FR

4078611276 TO 73694

P.16

Table 1 Soil Screening Results

Merritt Island National Wildlife Refuge

Location	Depth	OVA Reading	
		unfiltered	filtered
SB-1	1'	<2 ppm	NA
SB-1	3'	<2 ppm	NA
SB-1	5'	<2 ppm	NA
SB-2	1'	<2 ppm	NA
SB-2	3'	<2 ppm	NA
SB-2	5'	<2 ppm	NA
SB-3	1'	<2 ppm	NA
SB-3	3'	<2 ppm	NA
SB-3	5'	<2 ppm	NA
SB-4	1'	<2 ppm	NA
SB-4	3'	<2 ppm	NA
SB-4	5'	<2 ppm	NA
SB-5	1'	<2 ppm	NA
SB-5	3'	<2 ppm	NA
SB-5	5'	<2 ppm	NA
SB-6	1'	<2 ppm	NA
SB-6	3'	<2 ppm	NA
SB-6	5'	<2 ppm	NA
SB-7	1'	<2 ppm	NA
SB-7	3'	<2 ppm	NA
SB-7	5'	<2 ppm	NA

SEP 22 '03 13:08 FR

4078611276 TO 73694

P.17



Department of Environmental Protection

1 Towers Office Building • 2800 Blair Stone Road • Tallahassee, Florida 32399-2400

DEP Form 62-761.820(1)
Form Title: Limited Closure
Summary Report
Effective Date: 7/13/98

Limited Closure Summary Report

This form is required for facilities that have sites with documented contamination requiring a site assessment in accordance with Chapter 62-770, F.A.C. This includes those facilities that are eligible for the Early Detection Incentive Program (EDI), the Florida Petroleum Liability and Restoration Insurance Program (FPLRIP), and the Petroleum Cleanup Participation Program (PCPP), pursuant to Sections 376.3071 and 376.3072, F.S. Documentation of procedures followed, and results obtained during closure shall be reported in this form, along with any attachments. This form shall be submitted to the County within 60 days of completion of the closure in accordance with Section A of the "Storage Tank System Closure Assessment Requirements."

Complete All Applicable Blanks. Please Print or Type

General Information

Date: <u>11/12/02</u>	FDEP Facility ID Number: <u>050402030</u>	County: <u>Brevard</u>
Facility Name: <u>Marlin Food Store White Ridge</u>		Facility Telephone #: ()
Facility Address: <u>Grass Road & Grace Commercial Way</u>		
Owner or Operator Name: <u>Steven Johnson</u>		Owner/Operator phone #: <u>(321) 941-0667</u>
Mailing Address: <u>P.O. Box 6504 Titusville FL 32762</u>		

Storage Tank System Closure Information

1. Were the storage tanks(s): (Check one or both)

<input checked="" type="checkbox"/> Aboveground	<input type="checkbox"/> Underground
---	--------------------------------------

2. General System Information

Types of Products Stored: <u>Crude Oil</u>	Number of Tanks Closed: <u>1</u>	Age(s) of Tanks: _____
--	----------------------------------	------------------------

3. Was the Limited Closure Summary Report Performed as a Result of: (check one or more)

<input checked="" type="checkbox"/> Tank Systems Removal?	<input type="checkbox"/> Spill Containment Installation?	<input type="checkbox"/> Change in Storage to a Non-Regulated Substance?
<input type="checkbox"/> Tank Systems Closed in Place?	<input type="checkbox"/> Dispenser Liners Installation?	<input type="checkbox"/> Release Prevention Barrier Installation?
<input type="checkbox"/> Piping Pump Installation?	<input type="checkbox"/> Secondary Containment Installation?	<input type="checkbox"/> Other? (please explain): _____

4. Please Check Yes or No to the following:

a. Was there previously reported contamination discovered on site? If yes, was	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
1. A Discharge Report Form submitted to the County?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. An investigation performed in accordance with Rule 62-761.820, F.A.C.?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. Is the depth to groundwater less than 20 feet?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
c. Are there monitoring wells on site? If yes, were they	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
1. Groundwater monitoring wells?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. Vapor monitoring wells?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
3. Used for closure assessment sampling?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4. Properly closed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5. Retained for site assessment purposes?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
d. If tanks were replaced, were contaminated soils returned to the tank excavation?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Signature of owner or operator

Signature of person performing
Limited Closure Assessment

Name of person performing
Limited Closure Assessment

(date)

(date)

11/12/02

Affiliation

Heart Recovery Group, Inc.

Printed on recycled paper.

SEP 22 '03 13:08 FR

4078611276 TO 73694

P.19

Client #: ORL-11-110401
Address: Asset Recovery Group Inc.
2140 W. King Street
Cocoa, FL 32926
Attn: Jim Carey

Page: Page 2 of 2
Date: 11/06/2002
Log #: L69268-1

Sample Description:

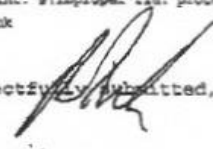
Analytical Report: SB-7
Date Sampled: 10/30/2002
Time Sampled: 10:18
Date Received: 10/31/2002
Collected By: Client

Proj. #: MINWR

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Florida Petroleum Range Organics (continued)							
Dilution Factor	1.0		FLPRO		11/01	11/02	RR
Surrogate Recoveries:							
-Terphenyl	63.0	%	FLPRO	62-109	11/01	11/02	RR
nitroacetonene	19.0 IL	%	FLPRO	60-118	11/01	11/02	RR
PAH Compounds							
benzene	BDL	mg/kg (dw)	5035/8260	0.0018	10/31	11/05	LN
toluene	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
ethylbenzene	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
total Xylenes	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
TBS	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
Dilution Factor	0.74		5035/8260		10/31	11/05	LN
Surrogate Recoveries:							
bromofluoromethane	62.0	%	5035/8260	52-155	10/31	11/05	LN
luene-d8	47.0	%	5035/8260	47-154	10/31	11/05	LN
Bromofluorobenzene	19.0 MI	%	5035/8260	36-138	10/31	11/05	LN

11 analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAP requirements.
 Lgs: BDL or U-below reporting limit; DL-diluted out; IL-meets internal lab limits; MI-matrix interference; NA-not appl.
 Lgs: CFR-Pb/Cu rule; ND-non detect (RL estimated); NYL-no free liquids; dw-dry wt; ww-wet wt; C(8)-see attached GUS code
 SP Flags: J(s)-estimated; 1-surr. fail 2-no known QC req. 3-QC fail 4R or 4RPD; 4-matrix int. 5-improper fld. protocol
 SP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < MDL; V-present in blank
 SP Flags: Y-improper preservation; B-colonies exceed range; I-result between MDL and PQL

980126 DOHS 186240 NC CERT# 444
 DOHS 26122, 26129, 266048 ADEM IDS 40850 IL CERT# 200030
 CERT# 95031001 TN CERT# 02385
 CE GA CERT# 917
 CERT# 00395 USDA Soil Permit# S-35240

Respectfully Submitted,

 Steve Walton
 Client Technical Svcs. Manager

SEP 22 '03 13:09 FR

4078611276 TO 73694

P.20

Client #: ORL-11-110401
Address: Asset Recovery Group Inc.
2140 W. King Street
Cocoa, FL 32926
Attn: Jim Carey

Page: Page 1 of 2
Date: 11/06/2002
Log #: L69268-2

Sample Description:

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
BTEX Compounds							
Benzene	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Toluene	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Ethylbenzene	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Total Xylenes	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
MTBE	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Dilution Factor	1.0		5030/8021	1.0	11/05	11/05	UE
Surrogate Recoveries:					11/05	11/05	UE
a,a,a-Trifluorotoluene	115	%	5030/8021	59-144	11/05	11/05	UE
Florida Petroleum Range Organics							
TPH (C8-C40)	BDL	mg/l	FLPRO	0.72	11/04	11/04	RR
Dilution Factor	1.1		FLPRO		11/04	11/04	RR
Surrogate Recoveries:					11/04	11/04	RR
o-Terphenyl	57.0 IL	%	FLPRO	82-142	11/04	11/04	RR
Trinitrocontane	33.0 IL	%	FLPRO	42-193	11/04	11/04	RR
Polynuclear Aromatic Hydrocarbons							
Naphthalene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
2-Methylnaphthalene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
1-Methylnaphthalene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Acenaphthylene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Acenaphthene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Fluorene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Phenanthrene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Anthracene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Fluoranthene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Pyrene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Benzo (a) anthracene	BDL	ug/l	3510/8270	0.20	11/02	11/04	GM
Chrysene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM

SEP 22 '03 13:09 FR

4078611276 TO 73694

P.21

Client #: ORL-11-110401
Address: Asset Recovery Group Inc.
2140 W. King Street
Cocoa, FL 32926
Attn: Jim Carey

Page: Page 2 of 2
Date: 11/06/2002
Log #: L69268-2

Sample Description:


Analytical Report: TW-1
Date Sampled: 10/30/2002
Time Sampled: 13:45
Date Received: 10/31/2002
Collected By: Client

Proj. #: MINWR

Parameter	Results	Units	Method	Reportable Extr. Limit	Anly. Date	Analyst
Polynuclear Aromatic Hydrocarbons (continued)						
benzo(b)fluoranthene	BDL	ug/l	3510/8270	0.20	11/02	GM
benzo(k)fluoranthene	BDL	ug/l	3510/8270	0.50	11/02	GM
benzo(a)pyrene	BDL	ug/l	3510/8270	0.20	11/02	GM
indeno(1,2,3-c,d)pyrene	BDL	ug/l	3510/8270	0.20	11/02	GM
benzo(a,h)anthracene	BDL	ug/l	3510/8270	0.20	11/02	GM
benzo(g,h,i)perylene	BDL	ug/l	3510/8270	1.0	11/02	GM
dilution Factor	1.0		3510/8270		11/02	GM
Inorganic Recoveries:						
nitrobenzene-d5	28.0	%	3510/8270	22-117	11/02	GM
fluorobiphenyl	34.0	%	3510/8270	34-150	11/02	GM
xyphenyl-d14	33.0	%	3510/8270	58-160	11/02	GM

All analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAP requirements.
 ug: BDL or U-below reporting limit; DL-diluted out; IL-meets internal lab limits; MI-matrix interference; NA-not appl.
 ug: CPM-Pb/Cu rule; ND=not detect (EL estimated); NPL=no free liquids; dw-dry wt; ww-wet wt; C(%)=see attached USG code
 EP Flags: J(%)=estimated 1:surr. fail 2:no known QC req. 3:QC fail NR or WRPD; 4:matrix int. 5:improper fld. protocol
 EP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < MEL; V-present in blank
 EP Flags: Y-improper preservation; S-colonies exceed range; I-result between MEL and PCL

380126 DCH# E86240 NC CERT# 444
 DCH# 86122,86109,E86048 ACH# ID# 40850 IL CERT# 200020
 CERT# 96031001 TN CERT# 02985
 TN GA CERT# 917
 CERT# 00395 USDA Soil Permit# S-35240

Respectfully submitted,

 Steve Walton
 Client Technical Svcs. Manager

Appendix D

Quarterly Sampling Result Tables Pump House 6, 2001-Present

NASA Citrus Grove Data 2001-Present

SITE ID	Date	PO4 mg/L	NO3 as N mg/L (1)	NO2 as N mg/L (1)	NOX as N mg/L (1)	TKN mg/L (1)	T-N mg/L (1)	T-P mg/L (1)	Water Temp (deg. C)	DO (mg/l)	pH (su)	Cond (us/cm)	Cond (us/cm)	Salinity (ppt)	Turbidity (NTU)
CGK-N-6	5/18/01	0.45	<1.0*	<1.0*	<2.0*	1.2	<2.2	<0.10	27.2	2.3	7.57	3740	3.74	0.33	2.15
CGK-N-6	11/16/01	0.54	0.11	<0.044	<0.154	1.2	1.3	0.51	20.1	2.04	7.30	1160	1.160	0.05	6.7
CGK-N-6	03/27/02	0.014	3.1	<0.044	3.1	2.6	5.7	0.22	26.0	0.36	8.00	3460	3.460	0.57	21.3
CGK-N-6	06/20/02	0.19	0.064	NA	0.081	1.5	1.6	0.22	24.2	0.92	7.28	4970	4.97	2.7	7.6
CGK-N-6	09/05/02	0.064	0.0075 U	0.0057 J	0.012 J	1.0	1.0	0.13	25.7	2.62	7.29	2408	2.408	1.2	7.11
CGK-N-6	11/14/02	0.24	0.050 J	0.0022 U	0.052 J	1.5	1.6	0.28	21.3	1.08	7.47	2298	2.298	1.2	3.57
CGK-N-6	03/06/03	0.10	0.060 B	0.25 U	0.30 U	0.59	0.59 B	0.11	21.5	2.35	7.49	2012	2.012	1	2.74
CGK-N-6	06/24/03	0.56	0.0075 U	0.014	0.018	1.8	1.9	1.1	29.2	2.38	7.28	2737	2.737	1.4	6.24
SWCTL		J	(-)	(-)	(-)	(-)	(-)	(-)	(-)	>5.0	6-8.5	1250*	1.250*	(-)	<29 NTU

Notes:

Values in bold font are in excess of MDL criteria.

SWCTL - Criteria from 62-302, Criteria For Surface Water Quality Standards, Class III, Predominantly Fresh, or F.A.C. 62-777, Groundwater and Surface Water Cleanup Target Levels.

(-) - No Applicable Standard

* - Chapter 62-302.530, Florida Administrative Code (F.A.C.), Criteria for Surface Water Quality Classifications for

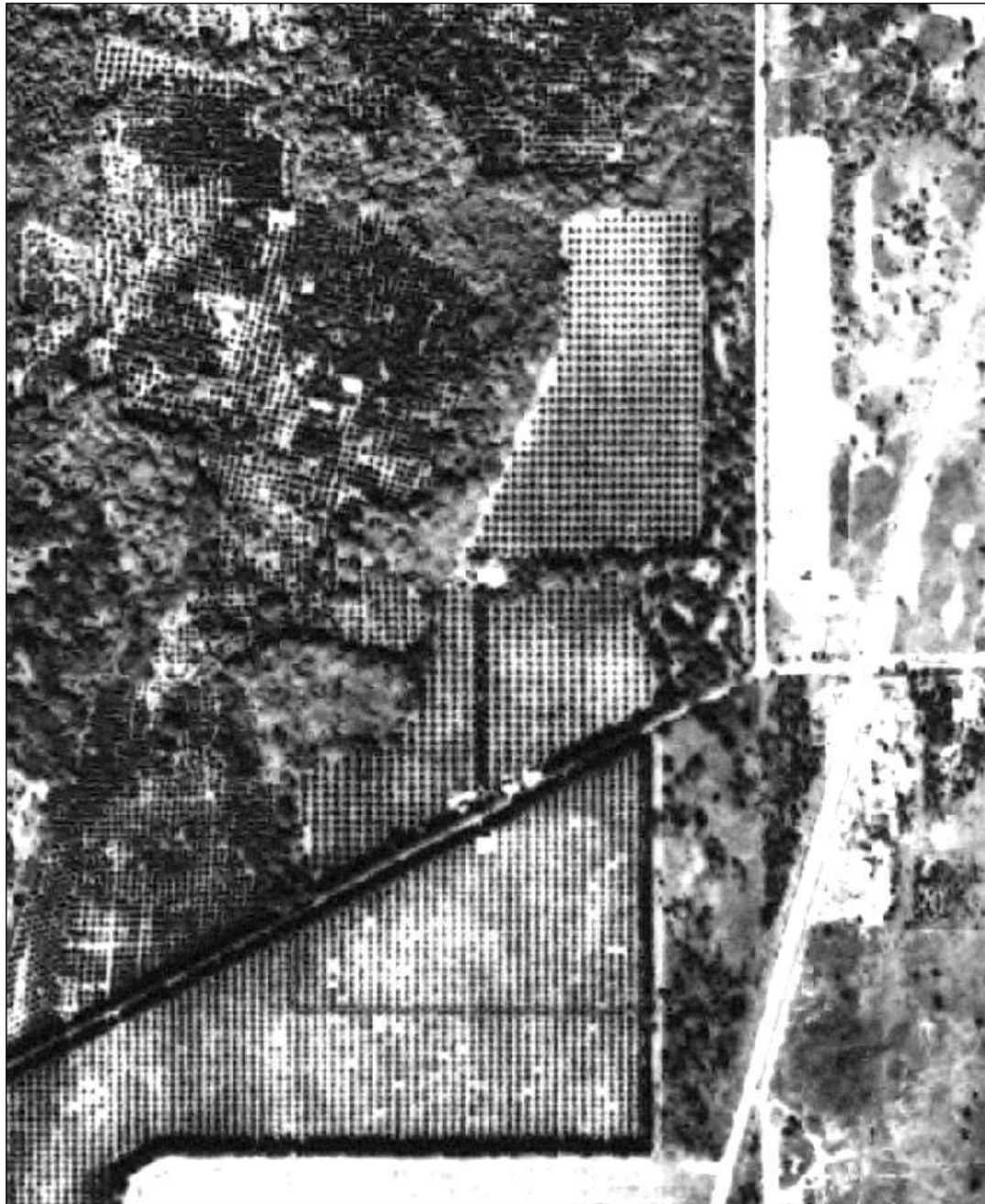
Predominantly Fresh, Surface Waters: Conductivity shall not be increased more than 50% above background, or 1275 (umhos/cm, 1.250 me/cm), whichever is greater.

Results followed by the letter "J" or "B" indicate an estimated value detected between the Laboratory's Reporting Limit (RL) and the respective Method Detection Limit (MDL).

Results followed by the letter "U" indicate the analyte was not detected at the MDL. The MDL value is substituted here for the non-detect.

Appendix E

1943 Historical Aerial Photograph



0 350 700 Feet

I = value is between the Method Detection Limit and the Practical Quantitation Limit

[illegible]

Table B-15: ICSC Background and raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the ICSC Background screening values.

		99C163 000000	99C164 000000	99C165 001100 Duplicate	99C166 000000	99C167 000000	99C168 000000	99C169 000000 Duplicate	99C170 000000	99C171 000000	99C172 000000	99C173 000000	99C174 000000	99C175 000000	99C176 000000	99C177 000000	
PAH (51%)																	
1-Methylanthracene	µg/kg	<19	<19	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	10	<21	<17	
2-Methylanthracene	µg/kg	<19	<19	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	42	<21	<17	
Acenaphthene	µg/kg	<19	<19	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	<20	<21	<17	
Acenaphthylene	µg/kg	<17	<19	<17	<14	<14	<17	<14	<19	<19	<14	<14	<14	<14	<14	<14	
Anthracene	µg/kg	<19	<19	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	<20	<22	<17	
Benz[a]anthracene	µg/kg	<19	2.8	2.4	<19	<17	<19	<17	<17	<17	<17	<17	<17	<2	<21	<17	
Benz[b]anthracene	µg/kg	<19	9	21	11	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	4	
Benz[k]fluoranthene	µg/kg	<19	7.1	4.1	11	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	
Benzofluoranthene	µg/kg	<17	0.9	1.1	12.1	<17	<17	<14	<17	<17	<17	<17	<17	<14	<14	<14	
Benzophenanthrene	µg/kg	<19	3.1	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	<19	<19	<19	
Chrysene	µg/kg	<19	3.7	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	<19	<19	<19	
Dibenz[a,h]anthracene	µg/kg	<17	<19	<17	<19	<14	<17	<14	<14	<14	<14	<14	<14	<14	<14	<14	
Fluoranthene	µg/kg	<17	<19	<17	<19	<14	<17	<14	<14	<14	<14	<14	<14	<14	<14	<14	
Fluorene	µg/kg	<17	<19	<17	<19	<14	<17	<14	<14	<14	<14	<14	<14	<14	<14	<14	
Indeno[1,2,3-cd]pyrene	µg/kg	<19	6.7	8.9	15	<17	<19	<17	<17	<17	<17	<17	<17	<17	<17	<17	
Naphthalene	µg/kg	<19	<19	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	<17	<17	<17	
Phenanthrene	µg/kg	<19	<19	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	<17	<17	<17	
Pyrene	µg/kg	<19	<19	<19	<19	<17	<19	<17	<17	<17	<17	<17	<17	<17	<17	<17	
Summaries																	
2,4-DCAA	%	56	44	112	132	61	52	88	40	72	48	76	64	84	70	48	36
2,4,6-TriClX	%	57	75	71	70	65	68	54	55	50	69	67	59	60	59	67	68
DBC	%	60	134	147	118	75	85	66	58	77	92	105	85	67	61	60	68
p-terphenyl	%	105	75	83	83	81	86	73	91	84	90	63	104	108	63	87	117
Metals																	
Aluminum	mg/kg	7200	2400	7000	3600	600	6000	1200	740	140	1400	210	1300	2700	400	3000	1300
Antimony	mg/kg	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	
Arsenic	mg/kg	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	
Barium	mg/kg	<22	<21	<22	<21	<21	<22	<21	<20	<20	<20	<20	<20	<20	<20	<20	
Beryllium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Cadmium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Calcium	mg/kg	1300	1950	12500	24100	9700	23100	410	820	500	6400	720	1000	6000	2500	22000	590
Chromium (total)	mg/kg	20	17	12	15	3.7	30	10	<1	<1	7.2	4.1	24	12	26	13	15
Cobalt	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Copper	mg/kg	100	100	110	110	24	130	51	14	11	64	5.3	20	32	60	33	36
Iron	mg/kg	3000	2200	1000	2000	570	3600	1100	180	100	940	100	1300	7200	400	3500	1000
Lead	mg/kg	0.3	0.9	0.5	0.6	1.9	17	5	<1	<1	10	1.5	5.5	5.5	4.3	4.2	5.5
Magnesium	mg/kg	660	100	110	660	120	480	120	120	80	9000	160	150	340	480	750	170
Manganese	mg/kg	90	100	100	100	29	110	17	12	7.3	43	6	80	110	110	63	6.9
Mercury	mg/kg	0.026	0.019	0.02	0.03	<0.01	0.06	<0.01	<0.01	<0.01	0.05	<0.01	0.014	0.011	0.011	0.011	0.042
Nickel	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/kg	490	<170	260	310	23	170	70	36	<1	12	<1	62	300	64	<210	50
Selenium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sodium	mg/kg	31	57	31	36	201	241	161	111	161	20	141	201	130	261	168	161
Thallium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	mg/kg	36	6.2	4	4.6	1.3	9	2.5	<1	<1	1.9	<1	2.4	19	19	9.5	4
Zinc	mg/kg	58	25	71	36	14	56	7.8	7	<1	36	<1	12	32	66	31	12

1 = value is between the Method Detection Limit and the Practical Quantitation Level
J = value is below the established limit for accuracy
* = 8510s were diluted (1:10)
** = 8511s were diluted (1:10)

Table B-16. ICSC Background raw data for soil locations. ** = value is an outlier and not used in the analysis to develop the ICSC Background screening values.

		SSC163	SSC164	SSC165	SSC166	SSC167	SSC168	SSC169	SSC170	SSC171	SSC172	SSC173	SSC174	SSC175	SSC176
		000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000
Other Parameters															
Bulk Density	g/cm ³	1.2	1.1	1	1	1.2	1.1	1.2	1.2	1.2	1.2	1.1	1.2	1.1	1.1
CEC	meq/100g	21	10	21	20	8	20	7	4	9	8	6	9	17	8
Percent Solids	%	89	85	99	74	90	90	97	99	99	98	98	98	81	98
pH (avg)	S.U.	6.3	8	7.4	7.8	7.2	6.8	6.8	7.2	6.8	7.7	7.2	7.4	7.8	6.1
Permeability	cm/cm	48000	116000	22900	25000	<12	1480000	<12	<12	<12	1480000	<12	<12	250000	64000
Texture (No. 4)	%	100	100	99.5	100	99.7	99.0	99.6	100	100	99	100	100	99.2	100
Texture (No. 10)	%	99.9	100	99.79	99.9	99.6	99.7	99.3	100	99.3	98.8	100	100	99.9	100
Texture (No. 40)	%	94.4	100	99.6	97	95.4	96.3	94.6	99.4	97.7	97.1	97.4	97.6	94.2	96.3
Texture (No. 60)	%	89	91.4	98.7	98.8	91.4	97.3	92.1	97.8	92.1	94.7	98.1	99.7	94.1	97
Texture (No. 100)	%	80.2	87.8	92.8	87.2	75.3	78	72.8	81.9	72	78	77.6	81.9	72.7	78.6
Texture (No. 200)	%	18.1	12.3	20.7	19	4.2	10.8	8.4	9.9	9.6	8.6	4.7	8	14.2	11.7
Total Organic Carbon	mg/kg	>28700	>28700	>28700	>28700	>28700	>28700	>28700	>28700	>28700	>28700	>28700	>28700	>28700	>28700

I = value is between the Method Detection Limit and the Practical Quantitation Level
J = value is below the established limit for accuracy
* = SSC169s were diluted (1:10)
** = SSC170s were diluted (1:10)

Appendix G

List of Federally and State Protected Wildlife Species within the ISRP Area

Protected wildlife species potentially occurring within a 0.8 km (0.5 mi.) radius of Ransom Road, Kennedy Space Center, June 2002

Scientific Name	Common Name	Level of Protection	Citrus Groves	Transmission Lines	Freshwater Marshes	Mixed Scrub-shrub Wetland	Mixed Wetland Hardwoods
Amphibians and Reptiles							
<i>Rana capito aescopus</i>	Florida gopher frog	state			X		
<i>Alligator mississippiensis</i>	American alligator	federal			X		
<i>Gopherus polyphemus</i>	Gopher tortoise	state	X	X	X	X	
<i>Drymarchon corais couperi</i>	Eastern indigo snake	federal	X	X	X	X	X
<i>Pituophis melanoleucus mugilus</i>	Florida pine snake	state					
Birds							
<i>Haliaeetus leucoccephalus</i>	Bald eagle	federal					
<i>Apelocoma coerulescens coerulescens</i>	Florida scrub-jay	federal		X			
Mammals							
<i>Peromyscus floridanus</i>	Florida mouse	state					

Scientific Name	Common Name	Level of Protection	Pine Flatwoods	4-lane Roads with Medians	Upland Mixed Coniferous/Hardwood	Wet Prairies	Wetland Forested Mixed
Amphibians and Reptiles							
<i>Rana capito aescopus</i>	Florida gopher frog	state				X	
<i>Alligator mississippiensis</i>	American alligator	federal				X	
<i>Gopherus polyphemus</i>	Gopher tortoise	state	X			X	
<i>Drymarchon corais couperi</i>	Eastern indigo snake	federal	X		X	X	X
<i>Pituophis melanoleucus mugilus</i>	Florida pine snake	state	X				
Birds							
<i>Haliaeetus leucoccephalus</i>	Bald eagle	federal	X				
<i>Apelocoma coerulescens coerulescens</i>	Florida scrub-jay	federal					
Mammals							
<i>Peromyscus floridanus</i>	Florida mouse	state	X				

**INTERNATIONAL SPACE RESEARCH PARK (ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

Prepared for:

Environmental Program Branch
National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

Prepared by:

J-BOSC
Environmental Health and Services
Environmental Compliance and Public Health
SGS-6230/CHS-022
Kennedy Space Center, FL 32899

March 2004

**INTERNATIONAL SPACE RESEARCH PARK (ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

Prepared for:
Environmental Program Branch
National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

Prepared by:
J-BOSC Environmental Health and Services
Environmental Compliance and Public Health Section
SGS-6230/CHS-022
Kennedy Space Center, Florida 32899

Prepared by:

Laura Sardella, CFEA, REPA
CHS, Inc.

Approved by:

Wilson R. Timmons, Jr., P.G.
CHS, Inc.

March 2004

This report was prepared in accordance with sound professional practices. The figures, tables and text have been reviewed and certified by a Professional Geologist registered in the State of Florida.

Wilson R. Timmons, Jr., P.G.
Registration #PG-0001255

ACRONYMS

AST	Above Ground Storage Tank
ASTM	American Society for Testing and Materials
bls	Below Land Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFEA	Certified Florida Environmental Assessor
CHS	Comprehensive Health Services
DCE	Dichloroethene
DPT	Direct Push Technology
ESA	Environmental Site Assessment
ESAR	Environmental Site Assessment Report
EC&PH	Environmental Compliance and Public Health
ESPC	Environmental Sanitation and Pollution Control
EDC	Engineering Document Control
EH&S	Environmental Health and Services
EPA	Environmental Protection Agency
EPB	Environmental Program Branch
ESA	Environmental Site Assessment
FDEP	Florida Department of Environmental Protection
FID	Flame Ionizing Detector
FLUCCS	Florida Land Use Classification Codes
F.S.	Florida Statutes
Gal	Gallons
GCTL	Groundwater Cleanup Target Level
GSA	Government Services Administration
ISRP	International Space Research Park
J-BOSC	Joint Base Operation Support Contract
JRASA	Jerome Road Agricultural Shed Area
KSC	Kennedy Space Center
LOC	Location of Concern
LTM	Long Term Monitoring
MILA	Merritt Island Launch Annex
mg/L	milligrams per Liter
MSDS	Material Safety Data Sheet
µg/L	micrograms per Liter
NASA	National Aeronautics and Space Administration
OVA	Organic Vapor Analyzer
PCAR	Petroleum Contamination Assessment Report
PAH	Polynuclear Aromatic Hydrocarbons
PH	Pump House
PRL	Potential Release Location
SGS	Space Gateway Support
STDNS	Spaceflight Tracking and Data Network Station
SJRWMD	St. John's River Water Management District

S-Band	Unified S-Band Station
STS	Soil Treatment Services
SVOCs	Semi Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leachate Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TRPH	Total Recoverable Petroleum Hydrocarbons
USFW	United States Fish and Wildlife
USGS	United States Geologic Survey
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds

**INTERNATIONAL SPACE RESEARCH PARK (ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

EXECUTIVE SUMMARY

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 107(b) creates the “innocent land owner defense”, in which any tenant, at time of land acquisition, did not know or have reason to know of land contamination. Chapters 376 and 403, Florida Statutes (F.S.), regulate the liability and defenses to Florida land contamination issues. F.S. Chapter 376, as currently amended, provides “innocent land owner defense” law similar to that implemented in the CERCLA statute.

To satisfy these requirements, appropriate inquiry into the land parcel must be conducted. A Phase I Environmental Site Assessment (ESA) was written for the proposed International Science Research Park at Kennedy Space Center (KSC). The ESA was conducted in order to identify areas of environmental concern, satisfying this requirement for the innocent land owner defense. A Phase II sampling was conducted to examine potential locations of concern for the presences or absence of environmental contamination. This report was developed for the future site of the International Space Research Park (ISRP) site to satisfy this requirement.

The ESA was conducted in accordance with American Society for Testing and Materials (ASTM) E-1527, Phase I Environmental Site Assessment Process. The Environmental Site Assessment (ESA) was performed in accordance to ASTM E-1528, for the proposed Phase II Environmental Site Assessment. ASTM E-1527, states that the Phase I ESA defines good commercial and customary practice for environmental contaminants within the scope of CERCLA and petroleum products. ASTM E-1528, Environmental Site Assessment, defines the scope of an investigational environmental site assessment, and will be followed during the sampling phase of the investigation.

This Environmental Site Assessment Report (ESAR) was prepared by Joint Base Operations Support Contractor (J-BOSC) Environmental Health and Services (EH&S), which supports the NASA/KSC Environmental Program Branch (EPB). The report summarizes the findings of the Phase I and II ESA, which was conducted by J-BOSC Environmental Compliance and Public Health (EC&PH).

Conclusions of this ESA of the ISRP area are based on information from data collected during the Phase I and II Environmental Site Assessments. Phase II sampling did not produce significant detections or exceedances, at the proposed locations, to verify that no negative impacts having occurred at the ISRP site. Considering that the site is intended to be developed as an industrial park, only exceedances of established industrial screening values should be considered as potential areas of concern for the development of the site. Based on that information, the results of this assessment indicate that citrus grove and surrounding facility operations have not negatively impacted the proposed ISRP environment.

TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
ACRONYMS	i
EXECUTIVE SUMMARY	iii
TABLE OF CONTENTS.....	iv
1.0 INTRODUCTION	1
2.0 SITE LOCATION, DESCRIPTION, AND HISTORY	2
2.1 Site Information	2
2.2 Site Description and History.....	6
2.3 Site Topography and Hydrology.....	6
2.4 Site Ecology	8
2.5 KSC Soil Background Study	8
2.6 ISRP Area Previous Investigations.....	8
3.0 ADJACENT PROPERTY DESCRIPTIONS AND HISTORIES	9
3.1 Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU # 21	10
3.2 Ransom Road Reclamation Yard, SWMU # 10	10
3.3 Ransom Road Landfill, SWMU # 3.....	10
3.4 Spaceflight Tracking and Data Network Station (STDNS), PRL #73.....	11
3.5 Jerome Road Agricultural Shed Area, PRL 57b.....	11
3.6 Adjacent Properties Environmental Investigations.....	12
3.6.1 Adjacent Property EC&PH Previous Investigations.....	12
3.6.1.1 Ransom Road Corrosion Control Previous Investigations:	12
3.6.1.2 Ransom Road Sandblast Yard Previous Investigations:.....	13
3.6.1.3 Ransom Road Landfill Previous Investigations:.....	14
3.6.1.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations	14
3.6.1.5 Jerome Road Agricultural Shed Previous Investigations:	16
3.6.2 Other Adjacent Property Environmental Investigations	17
3.6.2.1 Ransom Road Sandblast Yard Previous Investigations:.....	17
3.6.2.2 Ransom Road Reclamation Yard Previous Investigations:	17
3.6.2.3 Ransom Road Landfill Previous Investigations:.....	19
3.6.2.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations	20
4.0 ISRP SAMPLING LOCATIONS	21
4.1 LOC 1:	21
4.2 LOC 2:	21
4.3 LOC 3:	21
4.4 LOC 4:	21
4.5 LOC 5:	21
4.6 LOC 6:	21
4.7 LOC 7:	22
4.8 LOC 8:	22
4.9 LOC 9:	22
4.10 LOC 10:	22

4.11 LOC 11:	22
4.12 LOC 12:	22
5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	22
5.1 Quality Assurance/Quality Control Procedure	22
5.2 Decontamination and Waste Sampling	23
5.3 Laboratory Analysis	23
5.4 Sample Identification Method	23
6.0 CONFIRMATORY SAMPLING ANALYTES AND METHODS	24
7.0 ISRP PHASE II ENVIRONMENTAL ASSESSMENT SAMPLING RESULTS	28
7.1 ISRP Soil Sampling Results	28
7.2 ISRP DPT Groundwater Sampling Results	28
7.3 ISRP Sediment Sampling Results	33
7.4 ISRP Surface Water Sampling Results	33
8.0 CONCLUSION	33
REFERENCES	37

FIGURES

Figure 1 Location of KSC and ISRP Site	3
Figure 2 Aerial Photograph of the ISRP Area, May 2000 Flyover	4
Figure 3 Location of the ISRP Site and Adjacent Investigated Facilities	5
Figure 4 Topographic Map of ISRP Site	7
Figure 5 ISRP Proposed Sampling Location Site Map	27
Figure 6 ISRP Sampling Human Health Exceedance Map	31
Figure 7 Sampling Ecological Exceedance Map	32

TABLES

Table 1 ISRP Proposed Analyte List for Samples	25
Table 2 ISRP Proposed QA/QC	26
Table 3 ISRP Soil Results	29
Table 4 ISRP Groundwater Results	30
Table 5 ISRP Sediment Results	35
Table 6 Surface Water Results	36

APPENDICES

Appendix A	List of Interviewed Personnel
Appendix B	Citrus Grove Lease Agreement
Appendix C	Citrus Grove Tank Closure Report
Appendix D	Quarterly Sampling Result Tables Pump House 6, 2001-Present
Appendix E	1943 Historical Aerial Photograph
Appendix F	Dynamac Corporation KSC Background Study Results
Appendix G	List of Federally and State Protected Wildlife Species within the ISRP Area

**INTERNATIONAL SPACE RESEARCH PARK AREA
(ISRP)
KENNEDY SPACE CENTER, FLORIDA
ENVIRONMENTAL SITE ASSESSMENT REPORT
(Revision 0)**

1.0 INTRODUCTION

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 107(b) creates the “innocent land owner defense”, in which any tenant, at time of land acquisition, did not know or have reason to know of land contamination. Chapters 376 and 403, Florida Statutes (F.S.), regulate the liability and defenses to Florida land contamination issues. F.S. Chapter 376, as currently amended, provides “innocent land owner defense” law similar to that implemented in the CERCLA statute.

The intent of these investigations is to verify that the proposed ISRP location is free of contamination and is suitable site for the proposed industrial research park.

To identify potential environmental impacts related to operations at the ISRP, an Environmental Site Assessment was conducted in September 2003. The ESA included review of previous investigations, review of adjacent site investigations, site reconnaissance and interviews with personnel possessing knowledge of past work practices and operations at the site (Appendix A). The KSC collections of aerial photographs (Appendix E) and US Fish and Wildlife Service Records (USFWS) (Appendixes B and C) were reviewed. The objective of the assessment was to identify potential locations and contaminants of concern at the ISRP site and the need, if any, for further study.

Based upon the findings of the Phase I Environmental Site Assessment, a Phase II Site Assessment was conducted in January 2004, to verify if the proposed ISRP location was negatively impacted from current and previous operations at the site and if there are environmental impacts from operations from the surrounding facilities. Considering that the site under investigation is intended to be developed as an industrial research park, only exceedances of established industrial screening values should be considered as potential areas of concern for the development of the site. This report summarizes the Phase II investigation findings.

This Environmental Site Assessment Report (ESAR) was prepared by Comprehensive Health Services (CHS), Inc., subcontractor to Space Gateway Support (SGS), the Joint Base Operations Support Contractor (J-BOSC) for KSC for the NASA/KSC Environmental Program Branch (EPB).

The report summarizes the findings of the Phase I ESA that was conducted in 2003 by Laura Sardella, CFEA, and the Phase II investigation conducted in January 2004 by Charles D. Dobbs and John Williams, all of Environmental Compliance and Public Health (EC&PH) Section of the J-BOSC/CHS Environmental Health and Services (EH&S).

2.0 SITE LOCATION, DESCRIPTION, AND HISTORY

KSC is located on the northern portion of Merritt Island, between the Indian and Banana Rivers in Brevard County, Florida (Figure 1). The ISRP site is located in Sections 1 and 12, Township 23S and Range 36E, Courtenay Quadrangle (USGS 1976).

The ISRP site (Figure 2) is approximately 2,700 feet by 6,000 feet and is located approximately 2,000 ft. north of Jerome Road, on the south and extends northward to Space Commerce Way. The east boundary is defined by State Road 3 and the western boundary is approximately 700 ft. west of the Ransom Road Landfill. The site is bisected by Ransom Road.

2.1 Site Information

The ISRP site is currently is an active citrus grove. With the exception of a power line along Space Commerce Way, there are no utility services located at the ISRP site. There are no known archaeological or historical sites or interests at the ISRP site. No Air, PCB, Asbestos, or Radon concerns exist at this site and therefore will not be addressed in this document.

The grove area, which is the proposed ISRP location, is a combination of viably active and abandoned citrus groves. Roy Roberts and the Florida Research Center for Agricultural Sustainability, Inc. currently fund improvements in the actively used groves.

In August 2002, an 8,000 gallon (gal) above ground storage tank (AST) was removed from the north end of the site, adjacent to the northern surface water features. At the time of tank removal, the tank contained petroleum based crop spray oil. A tank removal and contamination assessment report was issued in November 2002 and is enclosed as Appendix C of this report. The secondary containment area for the tank was abandoned in place.

Environmental investigations have previously occurred at various locations at or near the ISRP site. Detailed information will be provided in Section 2.6 of this document.

There are four facilities within a 1 mile radius from the center of the ISRP site that are identified RCRA SWMU locations (Figure 3). Three facilities identified SWMUs are undergoing Long Term Monitoring (LTM). These facilities are Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU # 21; Ransom Road Landfill, SWMU # 3; and GSA Reclamation Yard SWMU # 10. At Ransom Road Reclamation Yard, West, SWMU #36, a facility investigation has yet to commence.

Figure 1. Location of KSC and ISRP Site

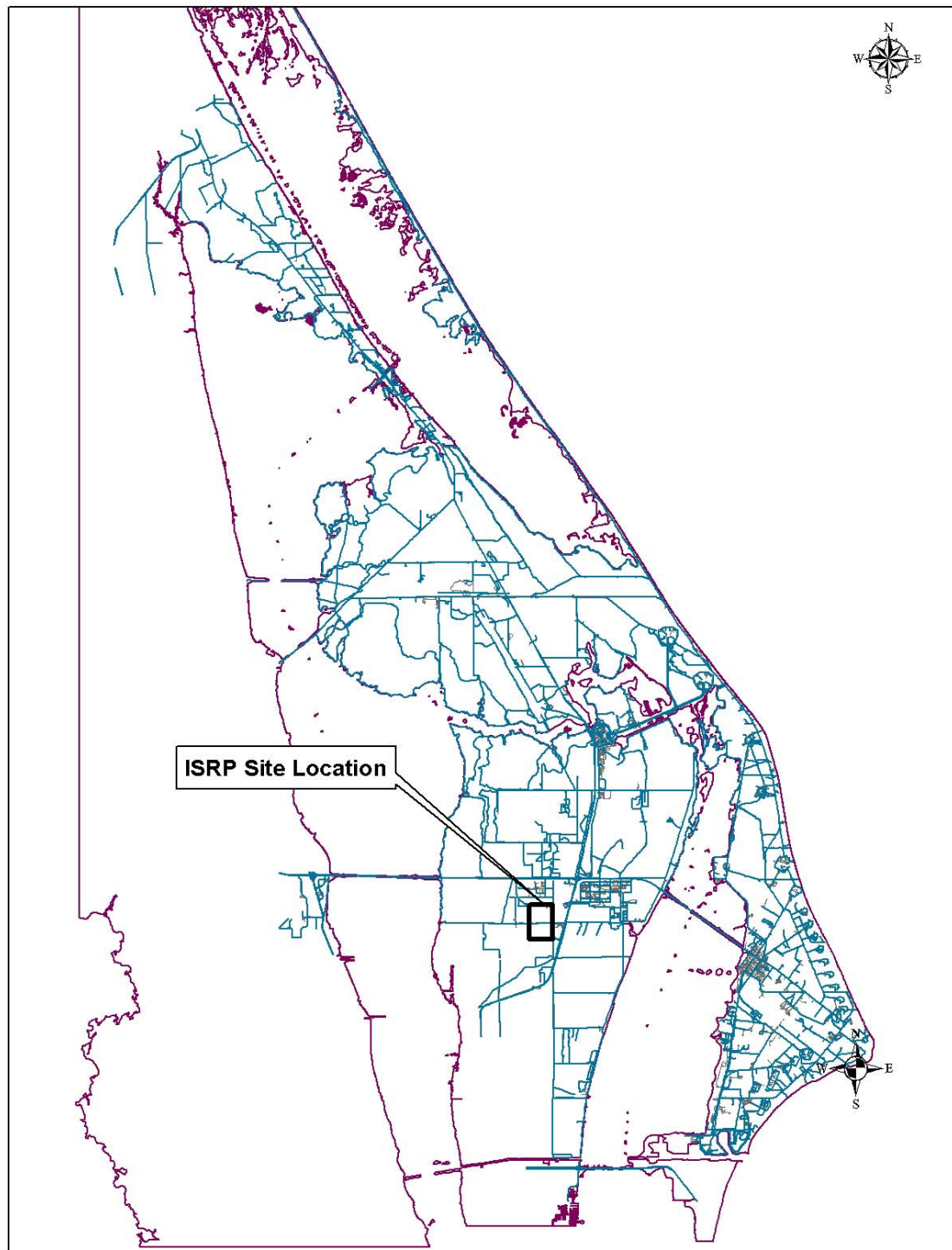


Figure 2. Aerial Photograph of the ISRP Area, May 2000 Flyover

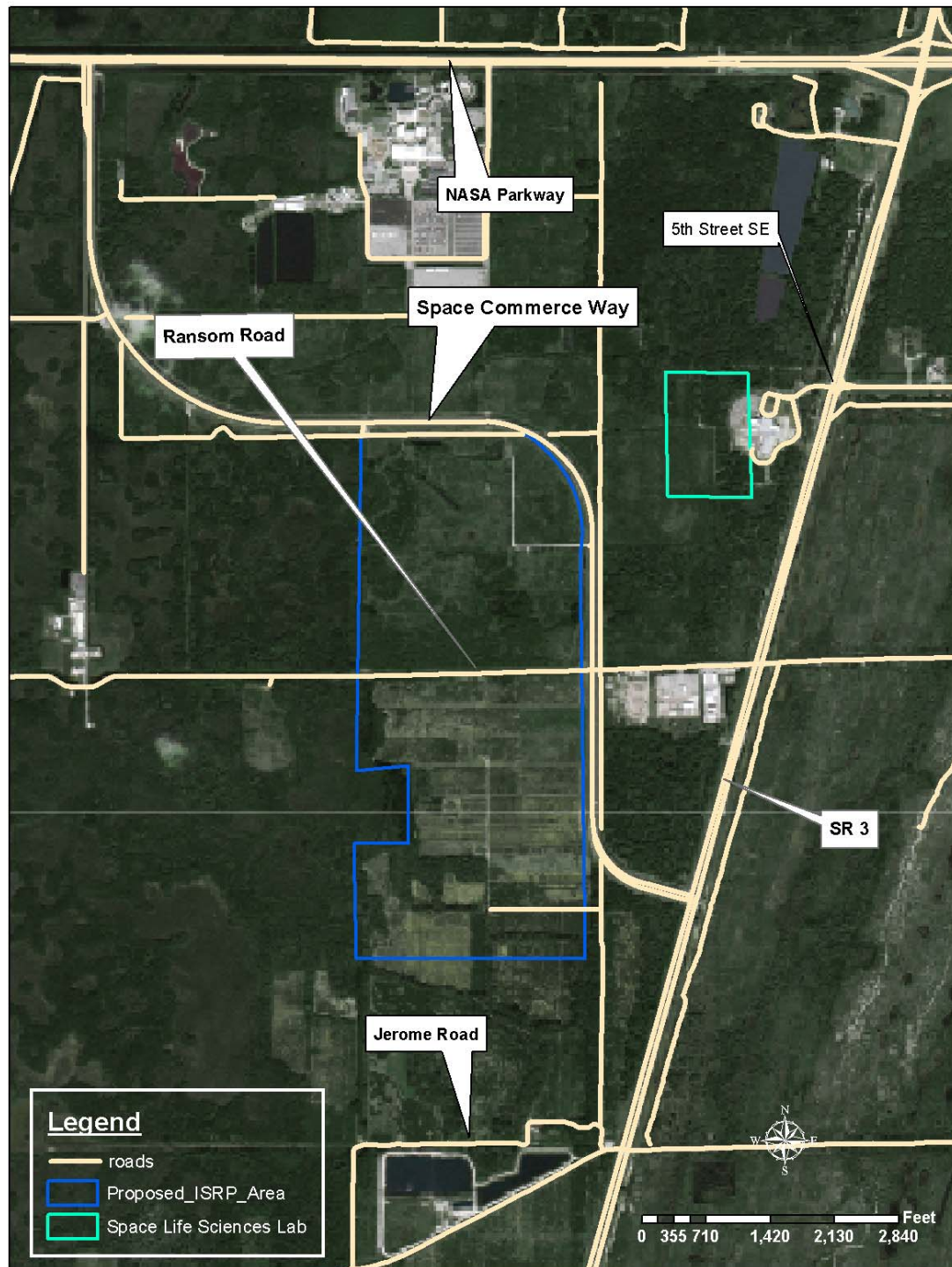
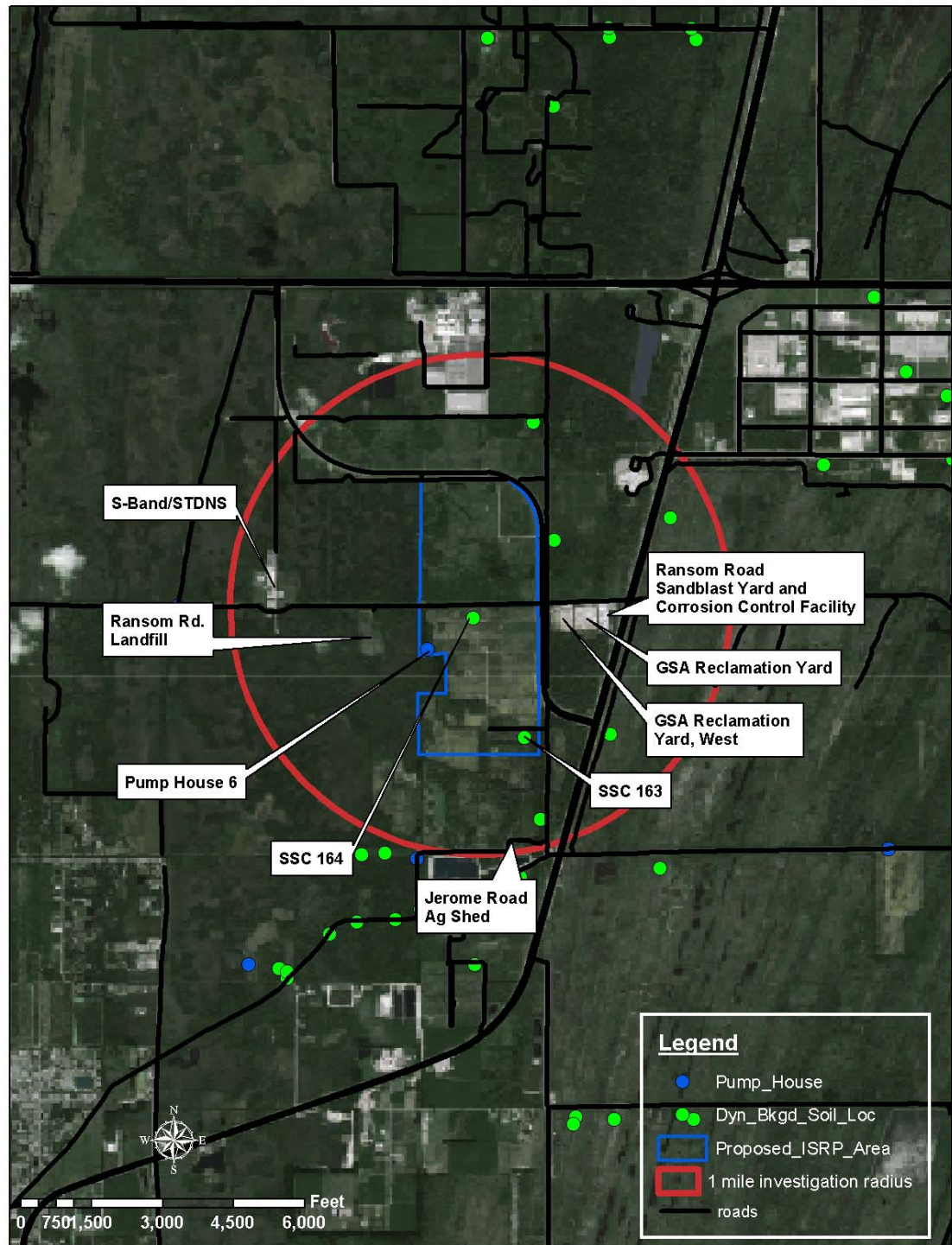


Figure 3. Location of the ISRP Site and Adjacent Investigated Facilities



2.1 Site Information (cont.)

There are two identified Potential Release Locations (PRL) adjacent to the ISRP site. Jerome Road Agricultural Shed Area, identified as PRL 57b, where a Phase II Investigation has been recently concluded and findings were presented to the NASA Remediation Team in August 2003. The second location, the Spaceflight Tracking and Data Network Station (STDNS), is identified as PRL #73. The facility has been referred to as the Unified S-Band Station (S-BAND), and the Merritt Island Launch Annex (MILA). Phase II sampling has been proposed and will be conducted in the near future. Historical information and environmental investigation details from these locations will be summarized in Section 3.6 of this document

2.2 Site Description and History

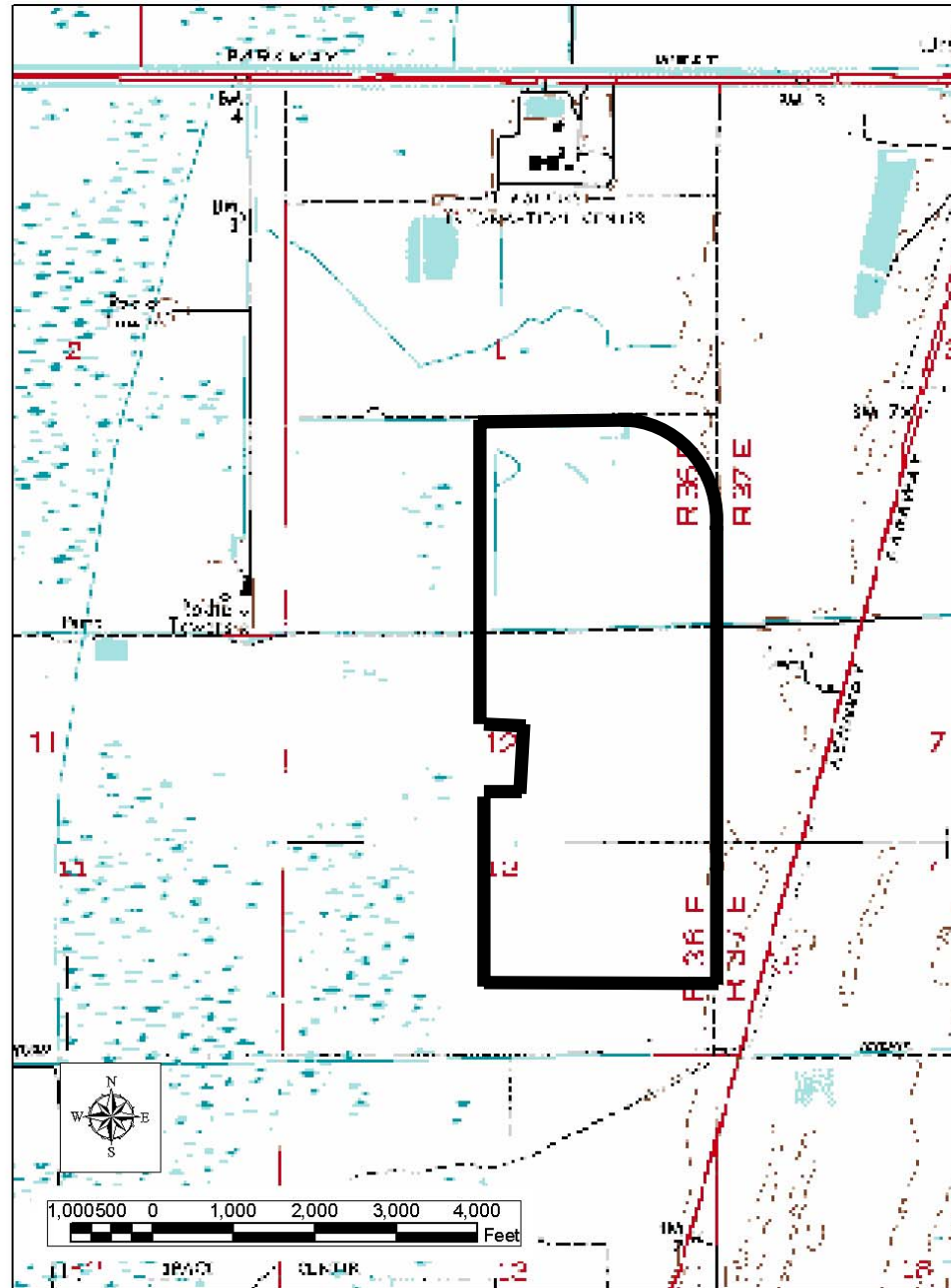
In the early 1960s the United States government purchased 140,000 acres for Space Flight Launch Operations. The purchased land included 2,389 acres of citrus groves. NASA offered leasing agreements, through United States Fish and Wildlife Service (USFWS), to the former grove owners. The lease has been administered by the USFWS since 1963.

Lease records reviewed were supplied by USFWS. Records reviewed show the citrus groves are currently operated by Roy Roberts, in conjunction with the Florida Research Center for Agricultural Sustainability, Inc. for Sustainable Agriculture. The groves are currently being studied to determine their agronomic and economic viability. The Florida Research Center for Agricultural Sustainability, Inc.'s contract with USFWS permits harvesting rights beginning June 1, 1998 through January 15, 2008. USFWS has no plans to continue citrus grove operations after the expiration of the current contract.

2.3 Site Topography and Hydrology

The topography of the ISRP site is relatively flat. Land surface elevations in the area are generally five feet above sea level (USGS, 1976 Courtenay Quadrangle Map, 7.5' Series). A topographic map of the site is provided in Figure 4. The KSC Background Study conducted by Dynamac Corporation, states the area consisting of the ISRP and surrounding groves are categorized as citrus hammock, and are located in the Indian River Lagoon Watershed. The St. John's River Water Management District (SJRWMD) 1995 Florida Land Use Classification Codes (FLUCCS) classifies the ISRP as citrus groves and upland mixed coniferous/hardwood, with soils consisting of Copeland-Bradenton-Wabasso complex and Riviera and Windar soils-depressional.

Figure 4: Topographic Map of Site



2.4 Site Ecology

The ISRP site has not changed significantly since the 2000 aerial photograph presented in Figure 2. The ISRP area does not provide a desirable habitat for indigenous fauna, and no ecological receptors were observed at the site during this investigation. A USFWS forester, interviewed for this investigation, stated the maintained grove benefited indigenous species of animals by providing open areas to travel between habitats. The location is expected to be habitat for indigo snakes, although it has not been officially recorded. Eagles are known to utilize the area for nesting materials and food scavenging. Invasive vegetative species, such as Brazilian pepper, cannot become established within the property, due to regular grove activities. However, the unmanaged grove has become overgrown with Brazilian Pepper due to lack of management. A list of federally and state-protected wildlife species potentially occurring within a half mile radius of the ISRP is presented as Appendix G of this report. This list is provided for guideline purposes only and was compiled from habitat/wildlife species relationship data collected from other sites on KSC by Dynamac Corporation

2.5 KSC Soil Background Study

Seven KSC Background soil sampling locations are located within the one mile radius from the center of the ISRP site, shown in Figure 3. Two of the sampling locations, SSC 164 and 163 are located within the site boundary itself. KSC Background Values for soils were collected by the Dynamac Corporation in July 1999. The samples collected within the ISRP boundary did not yield detections for Organo Pesticides, PCBs, or Chlorinated Herbicides. There were detections for several Polynuclear Aromatic Hydrocarbons (PAHs) and metals, which values were detected over the accepted background values for Citrus Scrub.

2.6 ISRP Area Previous Investigations

A review of EC&PH special projects file indicates three previous contamination investigations were conducted within the ISRP boundaries. Any current investigations, and investigations occurring after 1998, are conducted by J-BOSC/CHS EH&S EC&PH. Investigations prior to 1998 were conducted by EG&G Environmental Sanitation/Pollution Control Branch (ESPC).

In various locations within the KSC Citrus Groves are irrigation pumps. Currently, the citrus grove pumps are monitored on a quarterly basis for the Florida Research Center for Agricultural Sustainability, Inc. One pump, Pump House 6 (PH-6), is located within the boundaries of the ISRP site. PH-6 and associated diesel tank are located on the southern side of Ransom Road. Quarterly sampling at the site began in July 1997. Quarterly analysis includes Dissolved Oxygen (DO), pH, Conductivity, Salinity, Turbidity (Turb), Nitrate, Nitrite, Total Nitrogen, Nitrate + Nitrite (NOx), Total Kjeldahl Nitrogen (TKN), Orthophosphate (OP), and Total Phosphorus (TP).

April 1999:

In April of 1999, ditch water and groundwater samples were collected to help determine if the water quality was suitable for citrus grove irrigation. Elevated TDS and chloride concentrations in the samples collected indicated that the water sources were not suitable for irrigation purposes.

May through July 1993:

A survey of the KSC pump house stations was conducted May through July 1993. Samples were collected to determine the vertical and lateral extent of soil contamination, resulting from diesel fuel and lubricating oils used in the operation of the pumps. Samples were analyzed in the field using an Organic Vapor Analyzer (OVA) equipped with a Flame Ionization Detector (FID) to determine the concentration of volatile contaminants. Soil samples were analyzed at the Environmental Health Field Laboratory for Total Recoverable Petroleum Hydrocarbons (TRPH). Six surface soil samples were collected at Pump House 6 (PH-6). A recommendation of soil excavation to a rock layer, beginning at the western sample location to the culvert, was made for PH-6. According to one source, the soil was removed from the location. The diesel pump and associated tank are currently housed in a concrete containment adjacent to the water.

September 1992:

In September 1992, soil sampling was requested at PH-6 to verify potential hydrocarbon contamination at the site. Soil samples were collected from an area in front of the entrance of the pump house and extending for approximately twelve feet. An additional sample was collected on the north side of the Pump House. Samples were collected until a rock layer was reached. Samples were analyzed in the field using an OVA equipped with a FID to determine the concentration of volatile contaminants. Soil samples were analyzed at the Environmental Health Field Laboratory for TRPH. Results indicated the site was contaminated with petroleum compounds.

3.0 ADJACENT PROPERTY DESCRIPTIONS AND HISTORIES

An area of one mile radius around the center proposed ISRP site was examined for previous environmental investigations and adjacent properties of concern, which could potentially impact the ISRP site. Within a one mile perimeter were: four RCRA SWMU sites, two Potential Release Locations (PRL) sites, one grove irrigation pump house, and seven KSC Background Study soil locations.

Three SWMUs sites are currently undergoing Long Term Monitoring (LTM). These identified SWMU sites adjacent to the ISRP site are: Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU #21; GSA Reclamation Yard, SWMU # 10; and Ransom Road Landfill, SWMU # 3. A fourth SWMU site is Ransom Road Reclamation Yard, West, identified as PRL # 36, for which a site investigation has yet to commence.

Two identified Potential Release Locations (PRL) are adjacent to the ISRP site. Jerome Road Agricultural Shed Area, identified as PRL 57b, a confirmatory sampling investigation was recently concluded and findings were presented to the NASA Remediation Team in August 2003. The second location, the Spaceflight Tracking and Data Network Station (STDNS), is identified as PRL #73. A Phase I Investigation has been completed with a recommendation for confirmatory sampling.

3.1 Ransom Road Sandblast Yard and Corrosion Control Facility, SWMU # 21

This facility began operations in 1967. The facility's primary function is for sandblasting and painting of equipment. Equipment to be sandblasted and repainted was degreased and steam cleaned prior to arrival at the facility. Currently, a steel/iron and plastic bead sandblasting media is used. Previously a silica and walnut shell sandblasting media was utilized. Presently, used sandblast media is disposed of in the Schwartz Road Landfill, under a variance issued by FDEP. Used sandblast media must be sampled for Toxic Characteristic Leaching Procedure (TCLP) for RCRA metals. Sampling results must be below TCLP standards for hazardous wastes.

Various environmental investigations have been conducted at the site. The earliest recorded investigation, a site contamination survey, began in March 1990. HSW initiated RFI activities and site characterization at the site beginning in 1995. The RFI investigation, conducted by HSW Environmental Group, determined the groundwater flow to be west-northwest, towards the ISRP site.

3.2 Ransom Road Reclamation Yard, SWMU # 10

This facility began operations in the late 1960s. Ransom Road Reclamation Facility function is for the receipt and storage of materials to be sold as surplus (not scrap or recycled) materials. These include items and materials that are no longer wanted, out of date, or damaged. The purpose of the fenced yard and its ancillary buildings is for safe and secure storage of these materials. No treatment or disassembly of components takes place in the fenced portion of the Ransom Road Reclamation Facility. Drum crushing had previously occurred at this location until 1996.

This facility was identified as a PRL and was initially investigated in 1990 by EG&G ESPC. Environmental investigations impacts from activities of the facility are still actively under investigation. The site was later designated as a SWMU site and has undergone a comprehensive RCRA Facility Investigation (RFI).

The initial RFI investigation, conducted by HSW Environmental Group, determined the groundwater flow to be west-northwest, towards the ISRP site.

3.3 Ransom Road Landfill, SWMU # 3

Ransom Road Landfill was in operation from 1964 through 1968 as a disposal site for all types of debris generated during the growth and construction of the Kennedy Space Center. Solid waste cells were constructed via unlined trench and approximately 60% of the waste was buried below the water table. Concerns by the FDEP that the use of the landfill may have adverse impact upon the groundwater quality in the area lead to the closure of the site in 1970. The landfill was covered by an earthen cap in 1991, as NASA's interim measure response to FDEP concerns.

Groundwater investigations at the landfill site date back to 1984. To fully comply with FDEP concerns, NASA implemented a RFI for the landfill. The RFI was completed in April 1997. In 2000, NASA submitted the collected data and the Statement of Basis. Upon review by the regulatory agencies additional groundwater data was requested. An RFI Addendum/Long Term Monitoring Plan was provided and additional groundwater investigations were completed in 2001. The historical groundwater investigations determined the shallow and intermediate groundwater flow in this area to be to the northwest, towards the Indian River

3.4 Spaceflight Tracking and Data Network Station (STDNS), PRL #73

The Spaceflight Tracking and Data Network Station (STDNS) is identified as PRL #73. The facility is currently undergoing a confirmatory sampling investigation as part of the PRL investigation. The facility has been also referred to as the Unified S-Band Station (S-BAND), and the Merritt Island Launch Annex (MILA).

The STDNS uses radio frequency/microwave producing equipment and other equipment which operate utilizing frequencies which pose potentially hazardous sources of non-ionizing radiation (RF radiation). STDNS functions include: receiving and transmitting voice, tracking, telemetry, television, and command data to a spacecraft. Two 30-foot-diameter dish antennas and several other smaller antennas are located at the facility.

The KSC Background Study, conducted by Dynamac Corporation, states groundwater flow in this area is generally to the west toward the Indian River.

3.5 Jerome Road Agricultural Shed Area, PRL 57b.

The Jerome Road Agricultural Shed Area (JRASA), or Group II Agriculture Shed, site is identified as PRL 57b. The facility is currently undergoing confirmatory sampling, as part of the PRL investigation. The site is located within the citrus groves, directly to the south of the ISRP site.

The Agricultural (Ag) shed consists of one enclosed room and covered area containing vehicles, grove equipment, pesticides, herbicides, fertilizer, motor oil, and hydraulic fluid. Several steel and plastic Aboveground Storage Tanks (ASTs) and 55-gallon drums are located at the site. A burn pit approximately 4 feet by 4 feet was also observed approximately 15 feet south of the western side of the shed. No sanitary facilities, potable water or septic/sewer, have ever been located on the site.

The KSC Background Study conducted by Dynamac Corporation, states groundwater flow in this area is generally to the west toward the Indian River.

3.6 Adjacent Properties Environmental Investigations

A review of both EC&PH and NASA files contained details of various environmental investigations conducted at facilities adjacent to the ISRP site. Details of the various investigations are provided in this section.

3.6.1 Previous Investigations of Adjacent Properties by EC&PH

A review of EC&PH special projects file contained previous contamination investigations of the various properties, adjacent to the ISRP site. Investigations occurring after 1998, were conducted by J-BOSC/CHS EH&S EC&PH. Investigations prior to 1998 were conducted by EG&G Environmental Sanitation/Pollution Control Branch (ESPC)

3.6.1.1 Ransom Road Corrosion Control Previous Investigations:

May 1999:

During May of 1999, five soil locations were sampled along the eastern side of the sandblast facility. The samples were only analyzed for PCBs. All samples were below the detection limits of 0.60 mg/Kg dry weight.

April 1997:

In April 1997, a storage tank was cleaned and the water was flushed into the retention area. The paint within the tank had reportedly contained lead, cadmium, and chromium. Sampling consisted of three surface soil samples. One sample at location #3 was the southern most sampling point, near a temporary storage area, yielded detections for lead of 30.3 mg/Kg and chromium 10.1 mg/Kg.

August 1995:

In August 1995, eight soil samples were collected from a mound of excavated soil. Samples were field analyzed by an OVA equipped with a FID. The results of the analysis yielded results of less than 1ppm.

September/October 1994:

Soil and Groundwater sampling was requested in September of 1994. Sample analysis indicated low levels of lead, cadmium, and chromium. A number of collected soil samples exceeded the MCL of 10 mg/Kg for TRPH. Groundwater samples yielded exceedances of the MCL for aluminum, 0.2 mg/L, and iron, 0.3 mg/L.

3.6.1.2 Ransom Road Sandblast Yard Previous Investigations:

May 2000:

During May 2000, sampling was requested at the facility. The sampling site is located in an area that is east of the stormwater ditch running parallel to M6-1625 and south of the employee parking lot. Two samples were collected, one surface soil and the other at 2-ft bls. Both samples were below the screening criteria for PCBs.

February 1994:

In February 1994, a stockpile of sandblasting waste was sampled. The waste was stored next to the Ransom Road entrance gate on the east side of SR 3. The waste was supposed to be used for road maintenance. The stockpile measured 25 ft wide, 90 ft long and 3 ft high. Three samples were collected, for the west and east ends and the center of the stockpile. Samples were to be analyzed for total and TCLP metals and TRPH. Results indicated the concentrations of chromium, lead, and silver in all three samples; however there were no exceedances of screening criteria. Although there were not any exceedances of criteria, leachable constituents were detected in the TCLP analysis. Two of the three samples exceeded criteria for TRPH. It was concluded, based on the findings, that the stockpiles be removed from the site.

April 1993:

In April 1993, sampling was requested from an abandoned septic tank at the facility. A water sample was collected from mid-depth of the septic tank. A single sludge sample was collected from the bottom of the tank. The samples were analyzed for metals, TCLP metals, specific gravity, total solids, SVOCs and VOCs. Concentrations for all analytes were below detection limits. The sludge sample yielded detections for chromium, mercury, lead, several SVOCs and VOCs. Analysis produced no exceedances of screening criteria.

Also occurring in April 1993, thirty-six locations were sampled using an OVA equipped with a FID from soil which was excavated for installation of a new conduit line. Four samples produced detections in excess 50ppm. Additional samples were collected from these sites and were analyzed for TCLP metals, PAHs, and VOCs. One exceedance of screening criteria was detected in one sample for lead, all other analytes were below detection limits.

February/March 1993:

During the months of February and March 1992, soil and groundwater sampling was requested at the facility. Results indicated the presence of VOCs and PAHs. The sample which produced the detections was collected within the containment structure for the AST, located on the southwest corner of the sandblast yard. Groundwater samples did not any exceed any screening criteria for metals, PAHs, or TRPH.

October 1992:

In October 1992, eight soil samples were collected, following the footprint of the facility. The site was previously sampled for TCLP metals. Soil samples from each location collected at the surface, 1 ft, and 2 ft depths were mixed together and submitted as one composite sample. Results indicate that five of the eight lead concentrations exceeded screening criteria for metals. No other exceedances of criteria were noted.

July 1992:

In July 1992, three soil samples were collected and analyzed in the field with an OVA equipped with a FID. Soil samples from each location collected at the surface, 1 ft, and 2 ft depth, were mixed together and submitted as one composite sample for TCLP metals analysis. There were several leachable metals detected, none of which exceed the regulatory limits.

February/March 1992:

During the months of February and March of 1992, forty-six surface soil and twenty-four 1 ft. to the groundwater table (4 ft) soil gas samples were collected. Soil gas measurements were collected using an OVA equipped with a FID. Analysis showed that areas in the southern section had elevated levels of volatile compounds. The detections indicative of potential contamination appeared at approximately 2 ft and increased with the soil depth. The location of most heavily contaminated samples coincided with historical storage areas of hazardous waste drums. The detections at the northern end of the site coincided with an area where wooden pallets were stored.

December 1990:

During December 1990, a composite sample of sandblast material was submitted for TCLP metals analysis. All detections were below screening criteria.

3.6.1.3 Ransom Road Landfill Previous Investigations:

June/July 1996:

Sampling was requested at the facility the data collected indicates no volatile organic compounds were detected in samples collected from 40 and 63 ft bls, but four organic compounds were detected in the sample collected from 17 ft. bls. Three of these compounds met or exceeded their respective groundwater criteria.

July 1995:

The analysis of the groundwater samples collected produced exceedances for lead, iron, and TDS. Five samples exceeded criteria for benzene, and two samples exceeded criteria for vinyl chloride.

3.6.1.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations

December 1995:

On December 21, 1995, STP-11 was removed from service at STDNS. The STP was removed due to the high cost of splitting and refurbishing the existing percolation/evaporation pond as required by FAC 62-610. The replacement of STP-11 with a lift station was part of a regionalization of the KSC domestic wastewater systems.

3.6.1.4 STDNS Previous Investigations (cont.)

September 1995:

In September 1995 a Preliminary Assessment (PA) of the Generator Facility, M5-1544, was conducted by ESPC. The assessment was conducted to determine if historical operations at the facility may have impacted the soils, groundwater, and surface waters adjacent to the facility. Groundwater was sampled from five locations, soil samples from four locations and one surface water sample was collected. The samples were initially screened by the Environmental Health Field Screening Laboratory. Anomalies, if found were submitted to the sub-contract laboratory for analysis for SVOCs, VOCs, total metals and TRPH.

Laboratory analysis indicated the soils contained no detectable concentrations of VOCs. Di-n-butylphthalate was detected from a background location 350 ft north of the generator shop, and TRPH was detected from the location of the 250 gallon waste oil AST. The metal concentrations detected in the soil samples were consistent with KSC background soils. Groundwater analyses indicated no detectable concentrations of VOCs at any of the sample locations. The analytical results for metals indicated that concentrations were within the background conditions at KSC, with the exception of aluminum, iron, and manganese which exceeded GCTLs. Surface water analyses indicated no concentrations above screening criteria.

May 1992:

In May 1992 ESPC employees supported the construction of four monitoring wells around the construction of an AST containment area. Readings using an OVA equipped with a FID were conducted at the head space of the four wells, and the concentrations of organic vapors were all less than the FDEP target levels of 50 ppm.

June/July 1991:

Beginning in June of 1991, soil and groundwater samples were collected from the area surrounding a 25,000 gallon AST. Soil samples were collected from eight locations, and groundwater samples were collected from five of the soil sample locations. The soil samples were collected at one-foot intervals until reaching the capillary fringe and screened with an OVA. A representative soil sample was collected just above the capillary fringe and submitted for laboratory TCLP analysis. Groundwater samples were collected and submitted for laboratory analysis for PAHs, VOAs, Ethylene Dibromide (EDB), and Methyl Tert-Butyl Ether (MTBE)

The OVA results, for the soil samples collected ranged from 0 to >800 ppm. Excessively contaminated soil was encountered at each sampling location, with the highest concentrations detected between the depths of 3 and 6 ft bls. The laboratory results for the soil sample analyzed for TCLP indicated no exceedances. The groundwater analytical data indicated exceedances of screening criteria for 1-methylnaphthalene, 2-methylnaphthalene, total hydrocarbons, benzene, ethylbenzene, naphthalene, and phenanthrene.

May 1990:

The oldest investigation was conducted on May 12, 1990, by ESPC. The request was to sample soil from the area surrounding the 25,000 gallon AST, and the areas surrounding Antenna's #1, and #2. The sampling was conducted due to concerns of possible contamination from diesel fuel, and from paint chips from the sand-blasting and refurbishment of Antenna's #1, and #2.

Six soil samples were collected from around the AST area. Twelve field samples utilizing an OVA equipped with a FID were collected. The twelve OVA samples were collected at depths of 1 ft, 2 ft, 3 ft, and 4 ft bls from four locations, soil samples were collected at the 4 ft bls. The OVA results from the 1 ft bls samples ranged from 0 to 390 parts per million (ppm), 3 ft bls sample collected around the AST ranged from 0 to 220 ppm, 6 ft bls sample collected around the AST ranged from 0 to 106 ppm. All samples collected on the east and south side of the AST indicated excessively contaminated soil (>50 ppm OVA per Ch. 62-770, FAC). OVA detections from the other two locations did not exceed 2 ppm.

Soil samples analyzed for metals, cyanide, sulfide, and ignitability. Paint chip samples were also collected from the antennas. Review of the laboratory results indicate that all parameters were reported as less than the method detection limits.

3.6.1.5 Jerome Road Agricultural Shed Previous Investigations:

February 1995:

On February 8, 1995 groundwater sampling was performed by ESPC to confirm the findings from the April 28, 1993 sampling event. Two depths from two separate locations at the JRASA were sampled then analyzed for metals, volatile organics, pesticides, and herbicides. The first location was located on the west side of the shed near the surface water drainage ditch. The second location was located south of the facility directly under a large AST. The ESPC report stated laboratory analyses of the groundwater samples collected indicated all parameters tested for were below regulatory criteria.

June 1993:

On June 16, 1993, ESPC conducted a quarterly hazardous waste inspection of USFWS facilities at KSC. The ESPC report states the JRASA has several old ASTs on-site. In addition the report states chemicals stored in the shed were removed on June 18, and 19, 1993 and sent to an off-site operation center for the grove operator.

April 1993:

On April 28, 1993 groundwater samples were collected from four locations, one on each side of the shed. Groundwater samples were analyzed for total metals, solvents, TRPHs, PAHs, pesticides and herbicides. The report states laboratory analyses for groundwater samples indicated that the analytes below laboratory detection limits.

3.6.1.5 Jerome Road Agricultural Shed Previous Investigations (cont.)

March/April 1993

The first investigation began on March 29, 1993, at the request of NASA/KSC Environmental Management Office (EMO). The request to sample soil and groundwater was made based on the past usage and visual inspection of the JRASA by the EMO. Composite soil samples were collected from the shed floor, the outside perimeter of the shed, and a ditch which receives run-off water on the west boundary of the JRASA. Soil samples were analyzed for total metals, solvents, total recoverable petroleum hydrocarbons (TRPHs), polynuclear aromatic hydrocarbons (PAHs), pesticides and herbicides.

The laboratory analytical reports were not available for review during this investigation; however, the ESPC report states analytical results of the composite soil samples indicated concentrations of arsenic, mercury, chromium, and lead were detected. Based on these findings ESPC requested the laboratory to run Toxicity Characteristic Leaching Procedure (TCLP) analyses for these metals. The results of those analyses indicated no exceedances.

3.6.2 Other Adjacent Property Environmental Investigations

A review of NASA Remediation projects files contained contamination investigations of the various properties, adjacent to the ISRP site. Contractors which preformed the investigations will be identified with the investigation discussions.

3.6.2.1 Ransom Road Sandblast Yard Pervious Investigations:

In March 1996, HSW conducted surface water and sediment sampling in the ditches surrounding the GSA as part of the RFI Investigation of RRSA during 1996 and 1997. Fourteen sediment and thirteen surface water samples were collected and analyzed for pesticides and TAL metals. Some of the samples were also analyzed for VOCs and SVOCs. Selected surface water samples were filtered with a 0.45 micron filter to analyze dissolved (filtered) metals. PCBs were detected at concentrations exceeding criteria in all but two of the sediment samples. The highest PCB value was 4.8mg/Kg at SED-17. No point source of PCBs was identified. Various pesticides were detected in the sediment samples at levels exceeding the screening criteria values. Metals were also detected above screening values. The pesticide, 4,4-DDT, was detected in one surface water sample, SW-17. Several metals were detected in concentrations exceeding screening criteria. In 1999, the drainage ditches surrounding GSA and RRSA were excavated in June 1999 as part of an approved Interim Corrective Measure (ICM).

3.6.2.2 Ransom Road Reclamation Yard Previous Investigations:

Beginning in April 1990 the initial facility investigation was conducted by BOC using piezocone, hydrocone and DPT testing methods. Piezocone tests were used to identify lithology to 70 ft. bls. Hydrocone samples were collected to a depth of 36 ft bls, and DPT wells were installed to a depth of 10 ft. bls. Laboratory analysis of the groundwater indicated the presence of benzene, dichlorobenzene, and chlorobenzene above screening criteria.

3.6.2.2 Ransom Road Reclamation Yard Previous Investigations (cont.):

September 1990, Phase II of the investigation conducted by the BOC which consisted of surveying direct push wells, taking depth to water measurements, and sample collection consisting of surface and capillary fringe soil and surface water.

Commencing in March 1999 and concluding in February of 2001, HSW Engineering conducted an RFI Investigation of the Reclamation Yard. The following text is a summary of the HSW RFI investigation.

Two groundwater plumes were found underling the facility. One plume begins on the western side of the facility and extends to the eastern corner of the Ransom Road Reclamation Yard, West. The second plume begins on the northeast corner of the facility and extends north/northwest near the eastern most retention pond.

The western plume consists mainly of chloroethenes. The suspected source of the plume is thought to originate in the southwestern corner of the facility. The second plume, located on the northeastern side of the facility consists mainly of chlorobenzenes, pesticides, and PCBs.

Soil analysis detected several compounds above residential screening values, however; as that function of the facility is for industrial purposes, exceedances of only the residential values were not considered to be critical. Benzene exceeded leaching criteria in two locations near the west/northwest side of the property, and pentachlorophenol exceeded leaching criteria on the northeast side of the property. Mercury exceeded leaching criteria near the southwest corner of the site. Exceedances did not demonstrate a clear pattern of contamination. Pesticides exceeded both leaching and industrial criteria along the west, east, and northeast areas of the facility. PCBs exceeded both leaching and industrial criteria along the eastern side and northeastern corner of the facility. The highest concentrations occurring at the northeastern corner along the fence line. It is suspected this may be the source of the ground water contamination.

No VOCs or metals were reported above the screening criteria in the sediment. Pesticides and PCBs exceeded the screening criteria in both retention ponds and northern drainage ditches. It is believed that the accumulation of contaminants in the sediments are from runoff from the northeastern corner of the property. Vinyl Chloride (VC) was detected above screening criteria in the drainage ditch on the north side of Ransom Road. One pesticide was detected in the drainage pond. No metals were detected above the screening criteria.

An elevated ecological risk was assessed for the facility. Future plans for remediation at the site will address any ecological impacts that this site imposes.

3.6.2.3 Ransom Road Landfill Previous Investigations:

An investigation of the groundwater quality was begun in April 1984 and final findings were submitted by Clark Engineers-Scientists in December of 1986. Data collected indicated exceedances of screening criteria. As a result of the groundwater findings NASA implemented an RFI. The RFI was completed in April 1997 and a Statement of Basis submitted to the regulatory agencies, which requested additional groundwater sampling.

Findings from the Clark Study indicated the groundwater contamination exists at the site due to leachate generation from the closed landfill. A leachate plume was detected at the site. Elevated concentrations of ammonia, benzene, chlorobenzenes, chloroform, DCE, TCE, and VC were detected.

The 2001 RFI of the closed landfill was conducted by HSW. Sampling consisted of a groundwater investigation. Sampling was conducted in three phases during the year: Phase I consisted of monitoring well sampling, Phase II monitoring well and DPT sampling, and Phase III of DPT sampling only. VOCs, specially TCE, DCE, and VC and ammonia were detected in the groundwater samples collected at the southern end of the landfill. This location remains under longer term monitoring with land use controls in place.

A soil vapor survey was conducted from the area surrounding the 25,000 gallon diesel AST on January 8, 1992 by Applied Earth Sciences (AES). Soil was collected at one foot intervals from nine locations surrounding the AST. An OVA equipped with an FID was used to screen the soil samples. Groundwater was encountered between 2 ft bls and 5 ft bls at the nine sampling locations. The highest OVA readings were recorded from the location near the southwestern corner of the AST.

From August to September 1995, a PCAR was performed on a 250 gallon UST used for the storage of used oil located at the southeast corner of the Generator Shop (M5-1444). The report was prepared by U.S. Environmental Group, Inc.

Tank closure activities were initiated on August 14, 1995. The tank and associated piping was located underneath a concrete hold down slab. Upon removal of the hold down slab, the piping associated with the tank was disconnected, drained into the tank and capped at the east wall of the building. The oil remaining in the tank was removed using an air driven pump and contained on-site in a 55-gallon drum. The tank was then cleaned with a pressure washer and wastewater from the cleaning process was stored in two 55-gallon drums. The excavation was then back-filled with approved fill material.

As part of the closure assessment a soil boring was made on each side of the tank. Soil samples were collected at two foot intervals to a total depth of six ft bls from each of the borings and sampled using an OVA. No visible staining was observed in the soil from around the tank and excessively contaminated soil and OVA analysis did not detect any organic vapors.

3.6.2.4 Spaceflight Tracking and Data Network Station (STDNS) Previous Investigations

A temporary monitoring well was installed in the center of the former tank location on August 28, 1995. The well was installed to a total depth of 7.4 ft bls, with 0.010 slotted screen from 2.4 ft to 7.4 ft bls. The water table was encountered at approximately 5 ft bls. Groundwater was sampled from the well and analyzed for Priority Pollutants Volatile Organics, Priority Pollutants Extractable Organics, and Arsenic, Cadmium, Chromium, and Lead on August 31, 1995. Laboratory analytical results indicated no current exceedances were reported for the groundwater sample.

From August to January 1996 a PCAR was performed on a 6,000 gallon UST abandoned in place east of the OSB. The report was prepared by U.S. Environmental Group, Inc.

Tank closure activities were initiated in August of 1995. A concrete hold down pad was removed from over the UST and the piping was re-plumbed to the 25,000 gallon AST at the Generator Shop. Launch schedules delayed the removal of the UST until November 28, 1995. At this time soils surrounding the tank were excavated and stockpiled. The tank was cut open and the fill material was removed and also stockpiled on-site for future removal. The UST was removed from the ground and triple rinsed with a pressure washer. The water used to clean the tank was removed during the cleaning process and stored in eight 55-gallon drums for disposal by BOC-WMA. 104.47 tons of excessively contaminated soil was removed from the site for thermal treatment by Soil Treatment Services (STS). The concrete hold down pad was removed to the KSC landfill. The excavation pit was back-filled with approved fill material, and then compacted.

Soil assessment was included as part of the closure assessment. Soil samples were collected from all sides of the excavation and at a depth of 2 feet below the piping. The soil was screened using an OVA. The soil screening revealed excessively contaminated soil between 2ft and 6ft bls from the tank pit. The composite soil sample was collected on June 20, 1995 to provide a disposal profile. The sample was analyzed for SVOCs, VOAs, PAHs, Total Recoverable Petroleum Hydrocarbons (TRPH), and for 8 RCRA Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Analytical results from the soil sample collected indicated TRPH exceeded the SCTL. Lead, chromium and mercury concentrations exceeded EPA Region IV Ecological values.

A temporary well used to evaluate groundwater was installed at the center of the former tank location on December 11, 1995. The well was installed to a total depth of 12.45 ft bls, with 0.010 slotted screen from 2.45 ft to 12.45 ft bls. The water table was encountered at approximately 6 ft bls. Groundwater was sampled from the well and analyzed for VOAs and PAHs on December 14, 1995. Laboratory analytical results indicated no exceedances were reported for the groundwater sample.

A Petroleum Contamination Assessment Report (PCAR) was performed in April 1997 by Universal ES for OSB (M5-1494). The consensus was to take seven soil borings around the perimeter of the former 6,000 gallon UST to determine soil quality.

Soil was sampled from 12 locations in and around the former tank location at the depths of 2 ft, 4 ft, and 6 ft bls. One boring (boring 7) yielded an OVA response of 56 ppm at a

depth of 4 ft bls. No other readings above 50 ppm were recorded from any other depths from the sampling locations.

4.0 ISRP SAMPLING LOCATIONS

Thirteen locations (LOC) were identified and sampled at the ISRP site. LOCs are described below and are displayed on Figure 5. Soil sampling LOCs were chosen as random representative areas of active citrus groves. Groundwater sampling LOCs were chosen to identify impacts, if any, from the surrounding SMWU sites. Surface water and sediment sampling LOCs were chosen to identify any potential site impacts from runoff. Exact sampling LOCs, with an accuracy of 3 to 5 meters, will be provided as GPS coordinates in the final report. The following provides a summary of each location and the media type sampled.

4.1 LOC 1:

A diesel tank was reported once located at this location. The tank was reportedly replaced with a mineral oil tank, which was removed in 2002. Currently, only a concrete containment area remains at this location. A soil sample was collected at the containment area. Surface water and a sediment samples were collected from the surface water body.

4.2 LOC 2:

This location is located in the North West of LOC 1. The surface water body runs parallel to Space Commerce Way. Sampling included surface water and sediment samples.

4.3 LOC 3:

This location is located to the South of LOC 2 and South West of LOC 1. Sampling included both surface water and sediment samples.

4.4 LOC 4:

This location is located approximately 920 feet into the eastern property boundary and 1,500 feet north of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. A single surface soil sample was collected.

4.5 LOC 5:

This location is located approximately 1000 feet into the eastern property boundary and 1000 feet to north of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. A single surface soil sample was collected.

4.6 LOC 6:

This location is located approximately 350 feet into the eastern property boundary and 250 feet north of Ransom Road. This location was chosen to determine impacts, if any, from the SWMU/PRL locations directly to the east. A single groundwater sample by Direct Push Technology (DPT) was collected.

4.7 LOC 7:

This location is located approximately 230 feet into the western property boundary and approximately 230 feet north of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. A single surface soil sample was collected.

4.8 LOC 8:

This location is located approximately 250 feet into the eastern property boundary and approximately 250 feet south of Ransom Road. Sampling included a surface soil and DPT samples. This location was randomly chosen to determine impacts, if any, from the SWMU/PRL locations directly to the east.

4.9 LOC 9:

This location is Pump House 6. Pump House 6 is located approximately 230 feet into the western property boundary and down approximately 1000 feet south of Ransom Road. Sampling included a surface soil and DPT samples collected at the Pump House, which has an affiliated diesel tank, and has been the location of numerous environmental contamination investigations. Surface water and sediment samples were collected, at the Pump House culvert.

4.10 LOC 10:

This location is located approximately 500 feet into the eastern property boundary and approximately 1,400 feet south of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. Proposed sampling is for a single surface soil sample.

4.11 LOC 11:

This location is located approximately 700 feet into the eastern property boundary and approximately 1,400 feet south of Ransom Road. This location was randomly chosen to be a representative sample for a citrus grove. A single surface soil sample was collected.

4.12 LOC 12:

This location is located approximately 500 feet into the western property boundary on and approximately 2,500 feet south of Ransom Road. This location was chosen to determine groundwater impacts, if any, from the Ransom Road Landfill SWMU location to the North West of the site. A groundwater sample was collected.

5.0 QUALITY ASSURANCE/CONTROL AND SAMPLE IDENTIFICATION

5.1 Quality Assurance/Quality Control Procedure

Field quality control procedures follow guidelines set forth in the FDEP SOP. Procedures include: documenting pre-field and field activities, field measurement quality control data, and post-field activities are observed for these projects. Blanks, equipment rinses, and duplicates are also collected in accordance with the FDEP SOP. Documentation of all QA/QC procedures will be provided in the final report

5.2 Decontamination and Waste Sampling

Geoprobe rods, screens, drilling tools, and sampling equipment were decontaminated in accordance with the FDEP SOPs and the Program Wide Sampling and Analysis Plan for RCRA Facility Investigations at KSC. Decontamination fluids and investigative-derived media will be handled in accordance with KSC Procedures (Management of Investigation Derived Waste for NASA Operated Facilities at KSC and Cape Canaveral Air Force Station, Florida).

5.3 Laboratory Analysis

All analyses were conducted by Harbor Branch Oceanographic Institute Laboratories (HBOI), Fort Pierce, Florida. HBOI Laboratory analyses is an EPA National Environmental Laboratory Accreditation Program (NELAP) laboratory accredited by the State of Florida using standard test methods outlined in the EPA document "Test Methods for evaluating Solid Waste, Volume IB (SW-846)." Copies of all laboratory analytical reports are included in Supporting Document 1 of this report. A data quality report associated with this sampling event is included in Supporting Document 2 of this report.

5.4 Sample Identification Method

A sample identification system was used to assign unique names for identifying individual samples collected during this investigation. Each sample was assigned a descriptor for site location, sample matrix, sampling location and depth where applicable. All of the descriptors used are presented and explained in Table 3.

An example of this identification system is ISRP-HA-1. This sample name indicates that the sample is from the JRASA site, is a soil sample collected with a hand auger, and was collected at sampling location 1 from 0 to 1 foot below land surface (bls).

All field activities were performed in accordance with the Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOP), which provides instructions, checklists, specific protocols, and equipment necessary for conducting environmental media sampling.

Soil samples were collected with an appropriately decontaminated stainless steel hand auger or scoop. Samples were collected at the surface (0-1 ft bls). Sample volumes for all analyses were homogenized prior to filling sample containers.

Sediment samples were collected with an appropriately decontaminated scoop.

DPT groundwater samples were collected using a Geoprobe® sampling system in conjunction with a peristaltic pump with decontaminated High Density Polyethylene (HDPE) tubing. A mill-slotted (0.02") well point, one and a half ft in length, was used to collect the DPT groundwater samples at discrete saturated intervals. Threaded one-inch steel rods, three ft in length, was attached to the well point and hammer and driven to the desired sampling depth. After samples were collected at a location, the rods and well point will be removed and decontaminated. New tubing was used for each additional sampling location.

DPT groundwater samples, at this site, were collected at approximately 15 ft bls, with screen intervals of approximately 14.25-15.75. Once the desired sampling depth was obtained, the tubing was placed down the drill hole through the sampling rods. The tubing placement was approximately one foot (1 ft) above the bottom of the screen. Ground water was then purged using a peristaltic pump for approximately fifteen minutes, before samples were collected.

Surface water samples were collected with an peristaltic pump with decontaminated HDPE tubing and field filtered with a 0.45 micron filter in accordance with the FDEP SOP. Surface water samples were collected at mid-depth, if possible. Surface water samples were only collected if enough standing water is present to obtain a sediment free sample.

6.0 CONFIRMATORY SAMPLING ANALYTES AND METHODS

Soil and Sediment samples collected were analyzed for the Target Analyte List (TAL) Inorganics, by EPA Methods 6010 and 7471, the Target Compound List (TCL) SVOCs by EPA Methods 8270, the TCL Organochlorine Pesticides (OC Pests) by EPA Method 8081, Total Petroleum Hydrocarbons (TPH) by FL PRO, Organophosphorous Pesticides (OP-Pests) by EPA Method 8141, Carbamates and Urea pesticides (C&U Pests) by EPA Methods 632, pH by EPA Method 9045 and Total Solids (TS) by EPA Method 160.3. Field screening for organic vapors were conducted on all soil samples using an Organic Vapor Analyzer equipped with a Flame Ionization Detector (FID) and Photo Ionization Detector (PID).

Groundwater samples were analyzed for the same constituents and methods as the soil samples with the following exceptions. The DPT groundwater samples were not analyzed for metals due to false positives associated with turbidity and elevated suspended solids concentrations. Total Dissolved Solids (TDS) were analyzed using EPA Method 160. Field parameters including pH, conductivity, dissolved oxygen, temperature and turbidity, were collected in the field.

Surface water sample were analyzed for the same constituents and methods as the soil samples with the following exceptions. Total Dissolved Solids (TDS) were analyzed using EPA Method 160. Field parameters including pH, conductivity, dissolved oxygen, temperature and turbidity, were collected in the field

Table 1. ISRP Proposed Analyte List for Samples

Sample Location	Sample ID	Matrix	Designated Analysis	Rationale
LOC 1	ISRP-HA-1	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270 (SVOCs);8081(OC Pests); FI-Pro (TPH);8141(OP Pest);632 (C&U Pests);9045(pH);160.3 (TS)	A petroleum spray oil tank was once located on east end of surface water body.
	ISRP-SW-1	SW	6010/7470(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs) ;8081(OC Pests); FI-Pro(TPH); 8141(OP Pest); 632(C&U Pests);160.2(TDS); 130.1 (Hardness)	Surface water body.
	ISRP-SED-1	SED	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	
LOC 2	ISRP-SW-2	SW	6010/7470(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs) ;8081(OC Pests); FI-Pro(TPH); 8141(OP Pest); 632(C&U Pests);160.2(TDS); 130.1 (Hardness)	Surface water body.
	ISRP-SED-2	SED	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	
LOC 3	ISRP-SW-3	SW	6010/7470(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs) ;8081(OC Pests); FI-Pro(TPH); 8141(OP Pest); 632(C&U Pests);160.2(TDS); 130.1 (Hardness)	Surface water body.
	ISRP-SED-3	SED	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	
LOC 4	ISRP-HA-4	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	Randomly chosen to be representative of a citrus grove
LOC 5	ISRP-HA-5	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	Randomly chosen to be representative of a citrus grove
LOC 6	ISRP-GW-6	GW	8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)	Randomly chosen to determine impacts from SWMU sites to the east.
LOC 7	ISRP-HA-7	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	Randomly chosen site to be representative of a citrus grove
LOC 8	ISRP-GW-8	GW	8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)	Randomly chosen to determine impacts from SWMU sites to the east.
LOC 9	ISRP-HA-9	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	Pump House 6, location of irrigation pump and affiliated diesel tank. Directly east of Ransom Rd Landfill.
	ISRP-GW-9	GW	8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)	
	ISRP-SW-9	SW	6010/7470(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)	
	ISRP-SED-9	SED	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	
LOC 10	ISRP-HA-10	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	Randomly chosen site to be representative of a citrus grove
LOC 11	ISRP-HA-11	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	Randomly chosen site to be representative of a citrus grove
LOC 12	ISRP-HA-12	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);FI-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)	Randomly chosen site to be representative of a citrus grove

Table 2. ISRP Proposed QA/QC

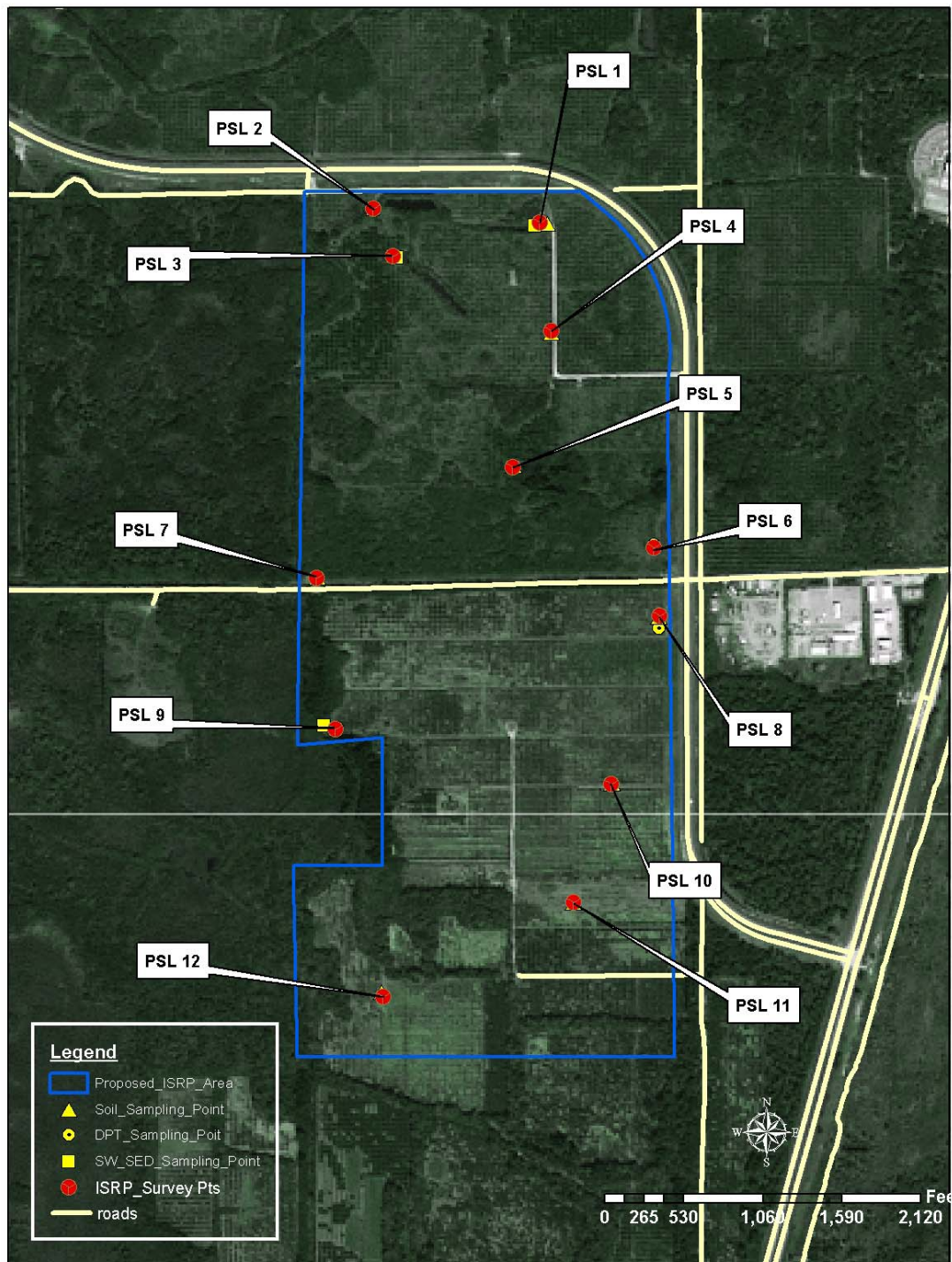
Rationale	Sample ID	Matrix	Designated Analyses
Field cleaned equipment blank. 1 per sample equipment/per project	ISRP-HA-ER	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)
	ISRP-GW-ER	GW	8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)
	ISRP-SW-ER	Surface Water	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)
	ISRP-SED-ER	Sediment	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)
Duplicate Sample. 1 per sample/per media	ISRP-HA-DUP	Soil	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)
	ISRP-GW-DUP	GW); 8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)
	ISRP-SW-DUP	Surface Water	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);160.2(TDS)
	ISRP-SED-DUP	Sediment	6010/7471(Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl,Zn); 8270(SVOCs);8081(OC Pests);Fl-Pro(TPH);8141(OP Pest);632(C&U Pests);9045(pH);160.3(TS)

Abbreviations:

ER: Equipment Rinse
DUP: Duplicate
GW: Ground Water
HA: Hand Auger

PCBs: Polychlorinated biphenyls
SED: Sediment
SVOCs: Semi-Volatile Organic Compounds
TPH: Total Petroleum Hydrocarbons
VOCs: Volatile Organic Compounds

Figure 5. ISRP Sampling Location Site Map



7.0 ISRP PHASE II ENVIRONMENTAL ASSESSMENT SAMPLING RESULTS

7.1 ISRP Soil Sampling Results

All locations and Human Health and Ecological exceedances, in addition to the KSC Background, are displayed on [Figure 6](#) and [Figure 7](#), respectively. All soil analyses are summarized in Tables 3.

There were three soil sample collected at 0-1 feet bls which had arsenic and copper concentrations that exceeded the residential soil cleanup target levels (SCTLs) an the respected KSC background values. There were no metal exceedances of the industrial SCTL or Florida Leachability Levels (FL LEACH), for any of the soil samples collected. No other analytes were detected in any of the samples collected

Arsenic (As) exceeded the residential screening criteria in the sample collected at location 9, which did not exceed the KSC background range high of 8.5 mg/Kg. Copper (Cu) exceedances exceeded the residential screening criteria in the samples collected from locations 11 and 12. The copper exceedance collected from location 12 was 310mg/Kg, which exceeded the accepted KSC background range high of 130 mg/Kg. The copper exceedance collected form location 11 was 380 mg/Kg, which exceeded the background range high of 130 mg/Kg.

There were nineteen detected exceedances of the Region IV Ecological Risk Assessment Value (ECO), in addition to the KSC Background value. There were two detected metal exceedances of the Eco criteria, which exceeded the KSC Background. As that the intended usage of the land parcel is for an industrial usage, the ecological exceedances will not be addressed in this report. Exceedances are identified in Table 3 and displayed on Figure 7, for informational purposed only.

There were several other metal detections in the soil samples collected at the ISRP site, which did not exceed established screening criteria. SVOC and TPH analyses yielded detections, which did not exceed the established screening criteria. Soil analyses did not yield detections for CI Pesticides, OP Pesticides, and C&U Pesticides.

7.2 ISRP DPT Groundwater Sampling Results

All groundwater locations and exceedances of Human Health, in addition to KSC BKGRD, are displayed on [Figure 6](#). All groundwater analyses are summarized in Table 4. TDS was the only analyte that exceeded the screening criteria in which there is not an established KSC Background value for comparison.

Table 3. ISRP Soil Results

Sample ID/ Screening Criteria	Metals (6010/7196/7470)										
	As	Ba	Be	Cd	Cr	Cu	Pb	Ni	Se	Ag	Tl
ISRP-HA-1	0.56	7.4	0.097	0.30	6.1	34	9.4	1.2	0.14 I	0.030 U	0.52 U
ISRP-HA-4	0.19 U	5.9	0.074	0.22	22	77	5.0	0.7	0.23	0.039 U	0.68
ISRP-HA-5	0.20 I	14	0.29	0.24	9.8	13	5.3	1.8	0.71	0.056 U	0.96 U
ISRP-HA-7	0.77	8.6	0.094	0.27	8.3	59	19	1.2	0.23	0.067	0.63 U
ISRP-HA-8	0.50	23	0.39	0.69	25	58	7.0	3.1	0.43	0.050	1.70
ISRP-HA-9	3.0	8.7	0.14	0.29	14	32	2.5	1.7	0.33	0.046 U	0.78 U
ISRP-HA-10	0.37	11	0.20	0.45	13	43	4.1	1.3	0.14 I	0.040 U	0.68 U
ISRP-HA-11	0.6	15	0.29	0.56	22	380	14	1.9	0.49	0.055 U	0.94 U
ISRP-HA-12	0.33	19.0	0.13	0.62	11	310	12	2.2	0.60	0.35	6.2
SCTL	0.80	110	120	75	210	110	400	110	390	390	(-)
Ind SCTL	5	8,700	800	1,300	420	7,600	920	2,800	10,000	9,100	(-)
FL LEACH	29	1,600	63	8	38	(-)	(-)	130	5	17	(-)
Ecol. SC	10	165	1.1	1.60	0.4	40	50	30.0	1	2	1
BKGRD	0.2 - 8.5	1.8 - 60	(-)	0.1 - 3	0.5 - 34	0.5 - 130	0.5 - 150	(-)	0.02 - 6	0.95 - 6	0.5 - 3.6
											1.2 - 140
											0.005 - 0.19

Sample ID/ Screening Criteria	pH (S.U.)	% Solids	TPH (FL PRO)	Cl Pests (8081)	OP Pests (8141)	C&U Pests (632)	SVOCs (8270)		
							BAP	FLAN	PYRD
ISRP-HA-1	7.74	93.2	17	ND	ND	ND	0.044 U	0.044 U	0.089 U
ISRP-HA-4	7.59	89.1	48	ND	ND	ND	0.045 U	0.045 U	0.092 U
ISRP-HA-5	7.62	77.7	14	ND	ND	ND	0.052 U	0.052 U	0.110 U
ISRP-HA-7	7.68	94.3	21	ND	ND	ND	0.0088 I	0.019 I	0.019 I
ISRP-HA-8	7.34	87.4	14	ND	ND	ND	0.046 U	0.046 U	0.094 U
ISRP-HA-9	7.82	85.5	12	ND	ND	ND	0.047 U	0.047 U	0.096 U
ISRP-HA-10	7.76	73.9	16	ND	ND	ND	0.055 U	0.055 U	0.110 U
ISRP-HA-11	6.71	85.1	14	ND	ND	ND	0.048 U	0.048 U	0.097 U
ISRP-HA-12	6.00	85.0	31	ND	ND	ND	0.048 U	0.048 U	0.097 U
SCTL	(-)	(-)	640	(-)	(-)	(-)	0.10	2,900	13
Ind SCTL	(-)	(-)	2,500	(-)	(-)	(-)	0.5	48,000	95
FL LEACH	(-)	(-)	340	(-)	(-)	(-)	8.0	1,200	0.03
Ecol. SC	(-)	(-)	(-)	(-)	(-)	(-)	0.1	0.1	(-)
BKGRD	(-)	(-)	(-)	(-)	(-)	(-)	0.001 - 0.25	0.0017 - 0.54	(-)

Screening Criteria

SCTL - FDEP Ch. 62-777, FAC, Soil Cleanup Target Level (SCTL), Residential (8/99)
Ind SCTL - FDEP Ch. 62-777, FAC, Soil Cleanup Target Level (SCTL), Industrial (8/99)
FL LEACH - FDEP Ch. 62-777, FAC, Leachability based on Groundwater Cleanup Target Level (GCTL) (8/99)
Reg. IV ECO - EPA Region IV Ecological Risk Assessment Value (ECO) (8/99)
BKGRD - KSC Background Study Value (7/99)

Abbreviations

BAP: Benzo(a)anthracene
C&U Pest: Carbinates and Ureas Pesticides
FLAN: Fluoranthene
NTU: Nephelometric Turbidity Units
OP: Organophosphorous Pests
Pests: Pesticides
PYRD: Pyridine
S.U.: Standard Units
SVOCs: Semi-Volatile Organic Compounds
TPH: Total Recoverable Hydrocarbons

Notes

Results ≥ SCTL are displayed in bold cells.
Results ≥ Reg. IV ECO are displayed in bold font.
There are no exceedances of Ind SCTLs or FL LEACH criterion.
Results ≥ Screening Criteria in addition to BKGRD are displayed in enlarged italics.
ND indicates the analyte group was not detected above various reported detection limits.
(-) indicates that no screening criteria value is assigned.
Values are expressed in mg/kg dry weight.

(I) Indicates that the analyte was detected below the laboratory reporting limit, but above the method detection limit.
(U) Indicates the analyte was not detected.

Table 4. ISRP Groundwater Results

Sample ID/ Screening Criteria	TPH (FL PRO)	SVOC's (8270)	CI Pests (8081)	OP Pests (8141)	C&U Pests (632)	TDS (160.1)	Field Parameters				
							pH (SU)	Cond (µmhos/cm)	Temp (°C)	DO (mg/L)	Turb (NTU)
ISRP-GW-6	ND	ND	ND	ND	ND	2,500	7.29	3,625	21.4	0.45	460
ISRP-GW-8	ND	ND	ND	ND	ND	930	7.29	1,564	22.1	0.27	412
ISRP-GW-9	ND	ND	ND	ND	ND	2,700	6.77	3,772	21.5	0.21	915
GCTL	5	(-)	(-)	(-)	(-)	500	6.5-8.5	(-)	(-)	(-)	(-)
BKGRD	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)

Screening Criteria

GCTL - FDEP Ch. 62-777, FAC, Groundwater Cleanup Target Level (GCTL), (8/99)

BKGRD - KSC Background Study Value, G-2 (7/99)

Abbreviations

C&U Pest: Carbamates and Ureas Pesticides

Cond: Conductivity

D.O.: Dissolved Oxygen

NTU: Nephelometric Turbidity Units

OP: Organophosphorous Pests

Pests: Pesticides

NTUs-Nephelometric Turbidity Units

TDS - Total Dissolved Solids

TPH: Total Recoverable Hydrocarbons

Turb: Turbidity

S.U.: Standard Units

SVOCs: Semi-Volatile Organic Compounds

Notes

Results ≥ GCTL are displayed in bold font.

Results ≥ Screening Criteria in addition to BKGRD are displayed in enlarged italics.

(<) indicates that the analyte was not detected above the reported detection limit.

ND indicates the analyte group was not detected above various reported detection limits.

(-) indicates that no screening criteria is assigned for this parameter or group.

All values are reported in mg/L, field parameters pH, conductivity and Temperature, except Turbidity.

Figure 6. ISRP Sampling Human Health Exceedance Map

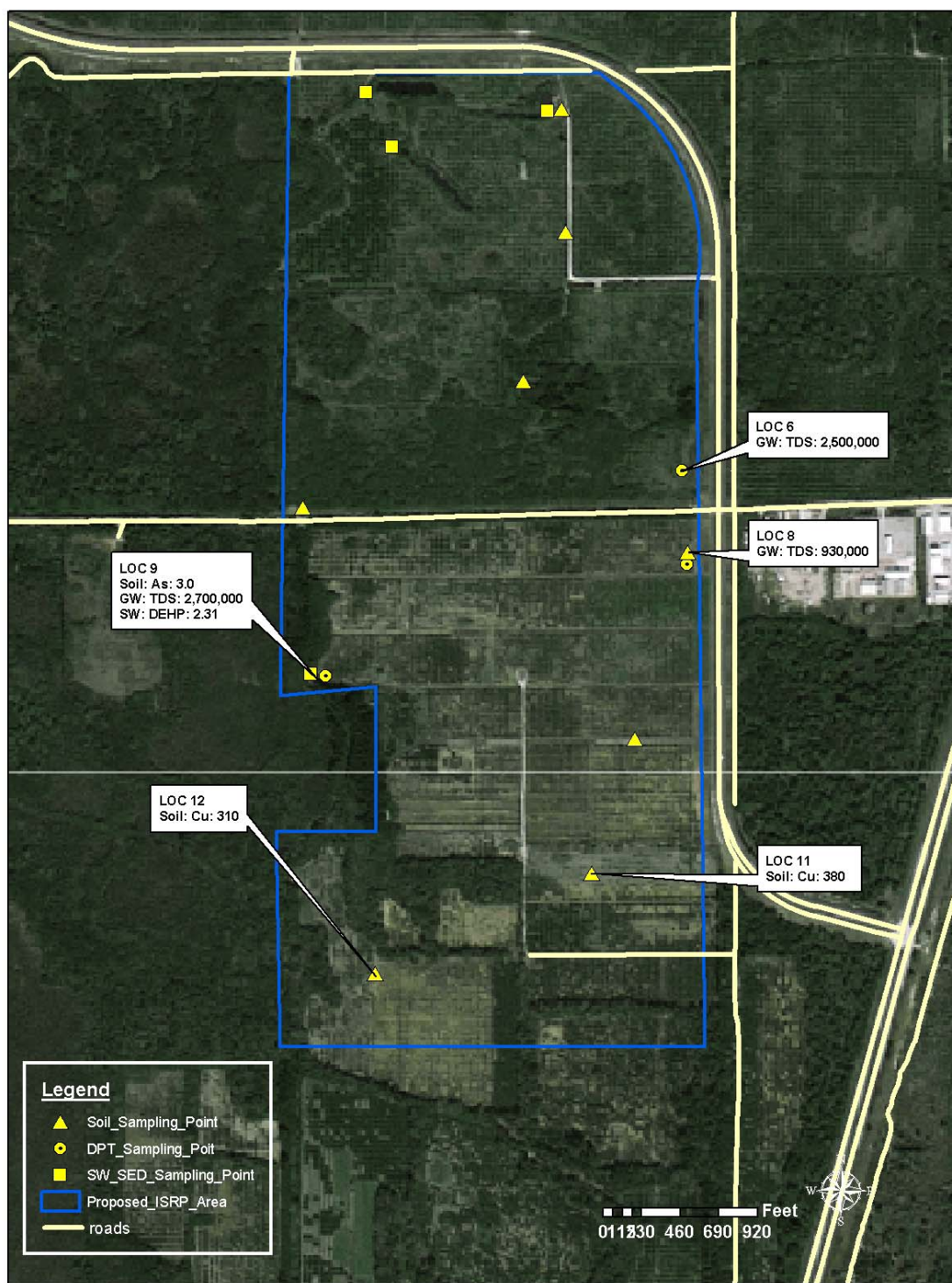
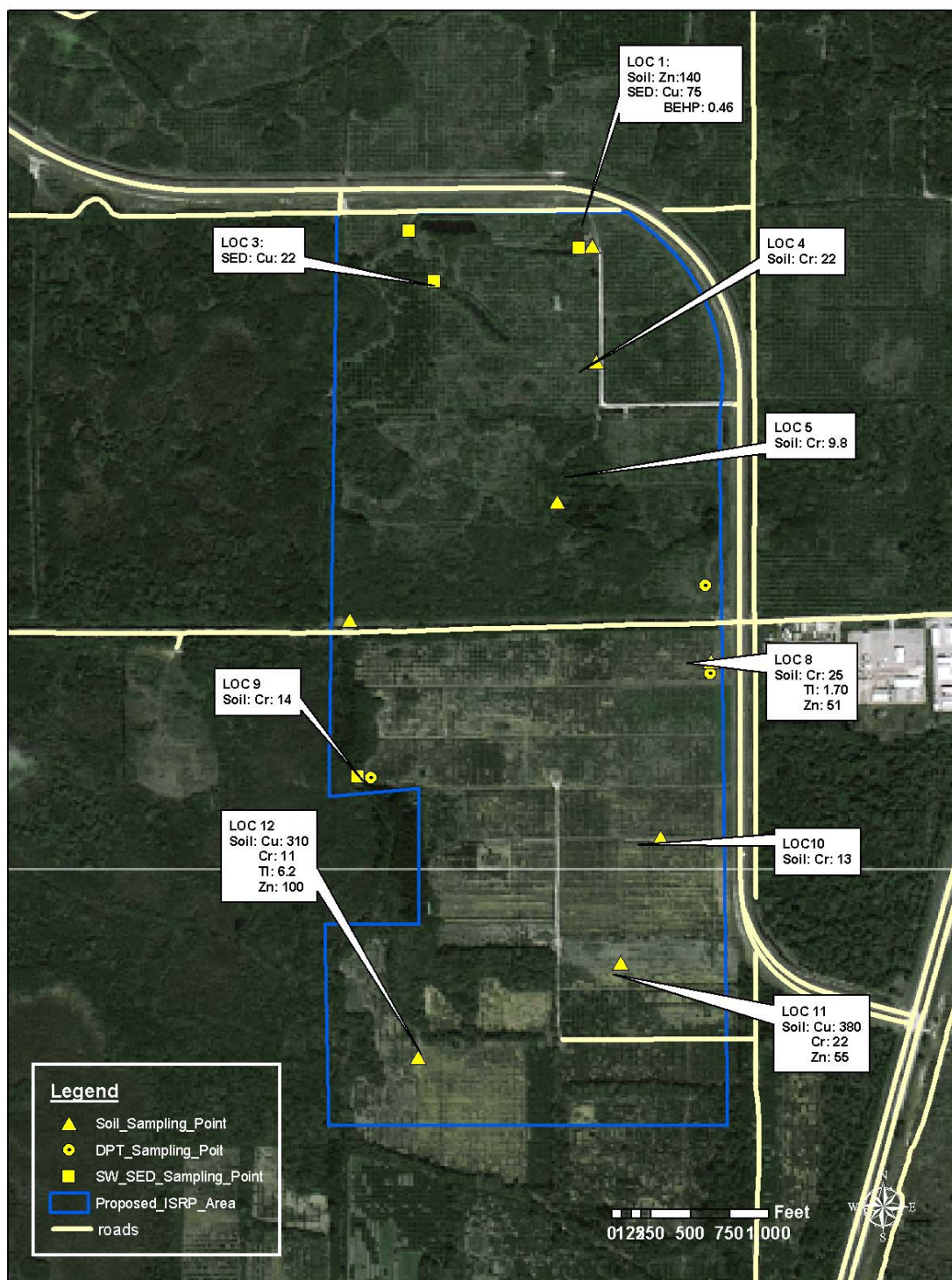


Figure 7. ISRP Sampling Ecological Exceedance Map



Concentrations of Total Dissolved Solids (TDS) exceeded the Groundwater Cleanup Target Level (GCTL) for all samples collected. Samples collected had high turbidity levels after a period of fifteen minutes of purging the groundwater. Groundwater analysis did not yield detections for TPH, SVOCs, Cl Pesticides, OP Pesticides, and C&U Pesticides. The field parameters pH, temperature, and Dissolved Oxygen (DO) were within normal ranges.

7.3 ISRP Sediment Sampling Results

As that the intended usage of the land parcel is for an industrial use, comparison to ecological criteria is only for informational purposes. Sediment was proposed and sampled to verify the site was not negatively impacted from grove activities. Exceedances are identified in Table 5 and displayed on Figure 7, for informational purposes only.

All sediment locations and exceedances of ecological criteria, in addition to KSC BKGRD, are displayed on [Figure 7](#). All sediment analyses are summarized in Table 5. Bis(2-ethylhexyl)phthalate (DEHP) was the only analyte that exceeded the Threshold Effects Level (TEL) screening criteria. There is no established KSC background value. There were detections of metals and TPH, which did not exceed exceedances of screening criteria. Cl Pesticides, OP Pesticides, and C&U Pesticides were not detected in any sediment samples.

7.4 ISRP Surface Water Sampling Results

All surface water locations and exceedances of Human Health, in addition to KSC BKGRD, are displayed on [Figure 6](#) and [Figure 7, respectively](#). All surface water analyses are summarized in Table 6.

Bis(2-ethylhexyl)phthalate (DEHP) was the only analyte that exceeded the Surface Water Cleanup Target Level (SWCTL) screening criteria, although there is not an established KSC Background value available for comparison. Barium and copper were detected in the samples; however, no screening criteria are established for comparison. One other SVOC, Di-n-butylphthalate (DNBP), was detected but did not exceed the screening criteria. TPH, Cl Pesticides, OP Pesticides, and C&U Pesticides were not detected in the samples.

8.0 SUMMARY AND CONCLUSION

Based on review of current and previous environmental investigations of the ISRP area and the data collected during the Phase II investigation it is concluded that the site has not been impacted from the activities that occurred at nearby SWMU sites.

The Phase II sampling results were conservatively compared to residential criteria. However, considering that the proposed ISRP location will be developed as an industrial park, results should be compared to established industrial screening values when considering the development of the site.

Based on laboratory analysis of the media collected at the proposed ISRP location, there was minimal environmental impact from citrus operations. Soil was the only media which yielded any human health exceedances. Arsenic and copper exceeded the residential human health screening criteria in three soil samples, but the industrial human health criteria were not exceeded.

Human contact with the locations where the exceedances were found is minimal, due to the current usage of the property. The human health screening values are based on acute exposures of children, not adults, and the current and future usage of this land parcel does not provide a means for acute exposure to children or adults. Exceedances were not within range of the Leachability criteria, therefore potential impact to ground and surface waters are negligible.

The results of this assessment indicate that citrus grove operations at the ISRP site have not negatively impacted the environment. Phase II sampling did not produce significant detections or exceedances at the proposed locations to indicate negative environmental impacts at the ISRP site from current grove operations or from the surrounding identified SWMUs.

Table 5. IRSP Sediment Results

Sample ID/ Screening Criteria	Metals (6010/7196/7470)											
	Sb	As	Ba	Be	Cd	Cr	Cu	Pb	Ni	Se	Zn	Hg
ISRP-SED-1	0.35	0.70	6.1	0.061	0.37	5.3	75	14	1.1	0.21	100	0.011 I
ISRP-SED-2	0.22 U	0.085 I	3.6	0.051	0.11	2.4	16	1.8	0.43	0.11 U	30	0.0065 I
ISRP-SED-3	0.26U	0.13	3.0	0.054	0.074	3.0	22	2.0	0.56	0.18	10	0.013 I
ISRP-SED-9	0.12 I	0.39	11	0.077	0.16	4.6	17	2.1	0.52	0.11	9.7	0.011 I
TEL	(-)	7.24	(-)	(-)	0.676	52.3	18.7	30.2	15.9	(-)	124	0.13
PEL	(-)	41.6	(-)	(-)	4.21	160	108	112	42.8	(-)	271	0.696
BKGRD	(-)	0.3 - 33	(-)	(-)	(-)	0.5 - 6.4	0.5 - 7	0.5 - 6	(-)	(-)	3 - 27	0.005 - 0.019

Sample ID/ Screening Criteria	TPH (FL PRO)	Cl Pests (808I)	OP Pests (8141)	C&U Pests (632)	pH (S.U.)	SVOC's (8270)				% Solids
						1-MN	2-MN	m&p- Cresol	DEHP	
ISRP-SED-1	13	ND	ND	ND	7.22	0.014 I	0.013 I	0.018 I	0.46	64
ISRP-SED-2	12	ND	ND	ND	7.46	0.061 U	0.061 U	0.025 I	0.12 U	68
ISRP-SED-3	73	ND	ND	ND	7.26	0.077 U	0.077 U	0.15 U	0.15 U	53
ISRP-SED-9	49	ND	ND	ND	7.37	0.071 U	0.071 U	0.14 U	0.14 U	58
TEL	(-)	(-)	(-)	(-)	(-)	(-)	0.0202	(-)	0.182	(-)
PEL	(-)	(-)	(-)	(-)	(-)	(-)	0.0202	(-)	2.647	(-)
BKGRD	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)

Screening Criteria:

TEL - Threshold Effects Level, FDEP Sediment Quality Assessment Guidelines Freshwater Sediments (1/03)
 PEL - Probable Effects Level, FDEP Sediment Quality Assessment Guidelines Freshwater Sediments (1/03)
 BKGRD - KSC Background Study Value, (8/99)

Notes:

There are no exceedances of either the TEL or PEL.

(U) Indicates the analyte was not detected.

(I) Indicates that the analyte was detected below the laboratory reporting limit, but above the method detection limit.

(-) Indicates that no screening criteria value is assigned.

Results are expressed in mg/kg dry weight.

Abbreviations

1-MN: 1-Methylnaphthalene
 2-MN: 2-Methylnaphthalene
 C&U Pest: Carbamates and Ureas Pesticides
 DEHP: Bis(2-ethylhexyl) phthalate
 NTU: Nephelometric Turbidity Units
 OP: Organophosphorous Pests
 Pests: Pesticides
 NTUs-Nephelometric Turbidity Units
 TPH: Total Recoverable Hydrocarbons
 S.U.: Standard Units
 SVOCs: Semi-Volatile Organic Compounds

Table 6. ISRP Surface Water Results

Sample ID/ Screening Criteria	Metals (6010/7196/7470)		Hardness (2340B) [CaCO ₃]	TPH (FL PRO)	CI Pests (8081)	OP Pests (8141)	C&U Pests (632)	SVOCs (8270)		TDS (160.1)	Field Parameters		
	Ba	Cu						DNBP	DEHP		pH (SU)	Cond (µmhos/cm)	Temp (°C)
ISRP-SW-1	42	1.4 I	480,000	ND	ND	ND	ND	9.6 U	9.6 U	910,000	7.21	1,347	14.0
ISRP-SW-2	34	2.7	430,000	ND	ND	ND	ND	9.7 U	9.7 U	920,000	7.17	1,368	14.7
ISRP-SW-3	27	2.7	440,000	ND	ND	ND	ND	1.0 I	9.8 U	900,000	7.04	1,069	15.4
ISRP-SW-9	220	2.0 U	740,000	ND	ND	ND	ND	0.93 I	2.3 I I	2,500,000	6.9	3,954	14.3
HH SWCTL	(-)	(-)	(-)	(-)	(-)	(-)	(-)	23	0.02	(-)	6.5-8.5	(-)	(-)
ECO SWCTL	(-)	(-)	(-)	5,000	(-)	(-)	(-)	23	(-)	(-)	(-)	(-)	(-)
BKGRD	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)

Screening Criteria:

HH SWCTL - Human Health (HH) endpoint values from:

FDEP Ch. 62-777, FAC, Surface Water Cleanup Target Level (SWCTL) (8/99) or

FDEP Ch. 62-302, FAC, Surface Water Quality Criteria (SWQC) (12/96)

ECO SWCTL - Ecological receptors (ECO) endpoint values from:

FDEP Ch. 62-777, FAC, Surface Water Cleanup Target Level (SWCTL) (8/99) or

FDEP Ch. 62-302, FAC, Surface Water Quality Criteria (SWQC) (12/96)

Notes:

Results > Human Health in Bold Cells

Results > Screening Criteria in addition to BKGRD are displayed in enlarged italics.

No exceedences of ECO SWCTL were recorded.

(U) indicates parameter was not detected.

(I) indicates that the analyte was detected between laboratory's detection limit and reporting limit.

(ND) indicates parameter group not detected above various laboratory method detection limits.

(-) indicates that no screening criteria is assigned for that parameter.

All values are reported in µg/L, except pH (S.U) and Turbidity(NTU).

Abbreviations

C&U Pest: Carbamates and Ureas Pesticides

Cond: Conductivity

DEHP: Bis(2-ethylhexyl)phthalate

DNBP: Di-n-butylphthalate

D.O.: Dissolved Oxygen

NTU: Nephelometric Turbidity Units

OP: Organophosphorous Pests

Pests: Pesticides

NTUs-Nephelometric Turbidity Units

TDS - Total Dissolved Solids

TPH: Total Recoverable Hydrocarbons

Turb: Turbidity

S.U.: Standard Units

SVOCs: Semi-Volatile Organic Compounds

REFERENCES

1. Dynamac Corporation, June 2002. Protected Wildlife Species List, Kennedy Space Center.
2. Edward E. Clark Engineer-Scientists, Inc, November 1995. KSC Groundwater Survey the Site Specific Program.
3. Edward E. Clark Engineer-Scientists, Inc, January 1997. KSC Subsurface Hydrology and Groundwater Survey Volume III CERCLA Remedial Investigations.
4. HSW Environmental Group, October 2001. RCRA Facility Investigation Report for the General Services Administration Reclamation Yard (SWMU #10).
5. HSW Environmental Group, March 1998. RCRA Facility Investigation Report for the Ransom Road Sandblast Area (SWMU #).
6. HSW Environmental Group, December 2001. RCRA Facility Investigation Addendum/Long Term Monitoring Work Plan for the Ransom Road Landfill (SWMU #3)
7. HSW Environmental Group, December 2001. Year 1 Annual Long Term Monitoring Report for January, July and December 2002 Semi-Annual Sampling Events at Ransom Road Landfill (SWMU #3), Kennedy Space Center, Florida.
8. J-BOSC Environmental Health and Services, January 2003. Spaceflight Tracking and Data Network Station (STDNS), Kennedy Space Center, Florida, SWMU Assessment Report, PRL #73 (Revision 1).
9. J-BOSC Environmental Health and Services, July 2002. Group Two Jerome Road Agricultural Shed Area (JRASA) N6-0065, Kennedy Space Center, Florida, SWMU Assessment Report, PRL #57b (Revision 0).
10. Paul A. Schmalzer et al, Dynamac Corporation, June 2000. Background Chemical and Physical Characteristics report. Kennedy Space Center, Florida.
11. NASA, February 2002. Screening Criteria Tables. Generic Document for RCRA Facility Investigations at Kennedy Space Center Florida and Cape Canaveral Air Station, Florida.
12. St. John's River Water Management District. 1995. Florida Land Use Classification Codes (FLUCCS).
13. USGS, 1976, Courtenay Quadrangle Map, 7.5' Series.

Appendix A

List of Interviewed Personnel

The Florida Research Center for Agricultural Sustainability, Inc., Robert Adair, (772) 562-3802

J-BOSC Corrosion Control, Systems Engineer, Robert (Bob) Perssons, (321) 867-4541

J-BOSC Environmental Health, EC&PH Section, D. Keith Johnston, (321) 867-3593

J-BOSC Environmental Health, EC&PH Section, E. Daniel Sciarini, (321) 867-3557

J-BOSC Environmental Health, EC&PH Section, John Williams, (321) 867-3619

GSA Reclamation Yard and GSA Reclamation Yard, West, Facility Manager, Dave Koval, (321) 867-4137

GSA Reclamation Yard and GSA Reclamation Yard, West, Property Disposal Officer, Pauletta Mc Guinness, (321) 867-7027

NASA, Environmental Program Office, Douglas Durham, 867-8429

NASA, Real Property, Leila Taylor, (321) 867-8492

United States Fish and Wildlife Services, Administrative Forester, Frederic (Fred) W. Adrian, (321) 861-6694

Appendix B

Citrus Grove Lease Agreement

SEP 22 '03 13:04 FR

4078611276 TO 73694

P.02

MEMORANDUM OF UNDERSTANDING

BETWEEN

U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE

AND

THE KERR CENTER FOR SUSTAINABLE AGRICULTURE, INC.

I. AUTHORITY

This Memorandum of Understanding lasting for ten (10) years between the U.S. Department of Interior, Fish and Wildlife Service (hereafter referred to as the "Service") and the Kerr Center for Sustainable Agriculture (hereafter referred to as the "Center") is hereby entered into pursuant to Section 1 of the Fish and Wildlife Service Coordination Act, 16 U.S.C. 661, and Section 7 of the Fish and Wildlife Act of 1956, 16 U.S.C., 742 f(a) (4). This document supersedes the Memorandum of Understanding between the Service and the Center numbered 1448-004-96-908.

II. BACKGROUND

By virtue of the agreement between the Service and the National Aeronautics and Space Administration, dated February 7, 1963, the Service is responsible for the operation of the citrus groves on Merritt Island National Wildlife Refuge (MINWR), and it desires to reduce the chemical and other inputs to the citrus operations on the refuge.

Over the last several years, the groves have not been economically viable for commercial citrus operations. For a period of time, during 1996 and 1997, groups 1, 3, 4 and 5 were managed by the Kennedy Space Center (KSC). This arrangement did not prove to be feasible, and the groves were returned to the Refuge under the above agreement. Due to the present economic conditions, and the poor condition of the groves, it is the decision of the Refuge that all the groups, including Group 2, should be assessed to determine their agronomic and economic viability. Only the portion of the groves that is viable will remain in operation. The remainder will be eventually converted to native vegetation, or utilized by Kennedy Space Center for facilities.

III. PURPOSE

The Service and the Center recognize that a sustainable agricultural approach to citrus management will reduce deleterious inputs, and it has been determined that

SEP 22 '03 13:04 FR

4078611276 TO 73694

P.03

2

there is a need to test the economic and cultural feasibility of a sustainable agricultural approach to the citrus groves on the MINWR at an operational scale. The viable MINWR groves have the potential to be a suitable area to test such feasibility.

There remains a current need to continue and expand knowledge and distribution of knowledge of low input and sustainable citrus culture. The Center is recognized as having knowledge and expertise in the area of developing and implementing plans for a Sustainable Citrus Program (SCP) that incorporate the principles of low input applications, IPM, and sustainable agricultural practices for citrus culture.

The operation of the refuge citrus groves should be based on sound environmental principles. The cooperators desire to work together to expedite the development of a SCP based on environmentally sound management plans for these groves.

IV. SCOPE OF WORK

In the consideration of the promises and mutual covenants herein contained, the parties hereby agree as follows:

A. The Center agrees to:

1. Assist the Service in determining which citrus groves have the best potential for viable citrus production.
2. Develop and implement the SCP for all of the viable citrus groves on MINWR that makes use of their current knowledge of low input, sustainable citrus culture. This program shall include provisions for citrus care including fertilization, pest control, weed control and other appropriate sustainable citrus horticultural practices.
3. Provide for a suitable caretaker to carry out the grove operations in accordance with the fore mentioned program.
4. Assist in the development of a SCP label for marketing the sustainable citrus products through Spaceport USA and/or other outlets.
5. To abide by the Service requirements as they apply to the application of pesticides and other chemicals.
6. Provide the Service with proof that the SCP caretaker will provide bonds or other suitable financial instruments for the period of the MOU.

SEP 22 '03 13:05 FR

4078611276 TO 73694

P.04

3

7. Provide the Service with an annual plan outlining grove caretaking practices that will be used.

8. Maintain records detailing the economic aspects of the operation of the SCP.

9. Provide annual and final reports including the agronomics, economics, and environmental details associated with the SCP. These reports shall be delivered to the refuge by November 1 of each year. The economic reports will be used to determine, in part, the occurrence of unspent funds as defined in Section C-1.

10. Receive funds from KSC obtained from previous sales of fruit from the Refuge groves and from the Caretakers derived from a percentage of the sales of fruit. The Center will use these funds to defray both the direct and indirect costs associated with the development and implementation of the SCP at the MINWR by the Center or their Contractors or any of their officers, agents, or employees. These costs would include but not be limited to the following:

- i. All administrative, management, and research costs
- ii. Purchase of equipment and/or machinery costs
- iii. Purchase of agronomic materials for the SCP at the MINWR groves.
- iv. Capital improvements for the MINWR groves, such as: machine work, tree removal, replanting citrus trees, drainage improvements, pump operations etc.
- v. Defray expenses for developing a SCP label.
- vi. All other costs incurred by the Center pertaining to the implementation of the provisions of Section A.

11. Provide to the Service annually, a complete and itemized accounting report prepared by the Center containing all costs associated with the implementation of the SCP at the MINWR groves. This accounting report may be subject to an outside audit by the Service at their expense.

12. Assist in seeking other partners for the experimental operation of the Refuge groves.

B. The Service agrees to:

1. Provide the citrus groves for the implementation of said plans.
2. Obtain access to the NASA security areas as needed by the Center employees.

SEP 22 '03 13:05 FR

4878611276 TO 73694

P.05

4

3. Seek assistance from NASA and other partners in obtaining and analyzing surface and ground water, soil samples and other samples.
4. Assist in determining the feasibility of retailing citrus through Spaceport USA.
5. Provide technical assistance, through Service contaminants and pesticide specialists, as to the fate of inputs applied to the citrus groves in the overall ecosystem.

C. It is Mutually Understood and Agreed:

1. Funds remaining after payment of allowable costs as listed in A-10, i-vi shall be treated as unspent funds.
2. Upon either the completion of the Period of Performance (Section V.) or early termination of this MOU (Section VI), the Center will return all unspent funds the Service.
3. A special marketing label for the citrus products grown under sustainable citrus culture program may be developed by the Center and made available for products certified by the Center.
4. Knowledge and techniques for sustainable citrus culture derived from the activities on MINWR will be made available to other citrus interests through field day demonstrations, publications or any other method deemed suitable.

V. PERIOD OF PERFORMANCE

The period of caretaking performance of this MOU shall be from June 1, 1998 through January 15, 2008. The Center shall have harvesting rights until July 31, 2008. The Service has no plans to continue citrus grove operation after this time.

VI. SPECIAL TERMS AND CONDITIONS

- A. All conditions and provisions of this MOU shall become effective upon final signature of both parties and shall remain in force for TEN years unless terminated by either party upon 180 days written notice.
- B. This MOU constitutes the full, complete and entire agreement between the parties. No modification of this agreement shall be binding on either party unless such modification shall be in writing, executed in duplicate by both parties, attached herewith, and incorporated in and by reference made a part of this MOU.

SEP 22 '03 13:05 FR

4878611276 TO 73694

P.06

5

- C. The Service's liability will be governed by the Federal Tort Claims Act (28 U.S.C) 2761 et seq.). The extent to the Center's liability shall be governed by the laws of the State of Florida.

IN WITNESS WHEREOF, the Service and the Center have made and entered into this Memorandum of Understanding on the date and year set forth below their signature.

U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE

THE KERR CENTER FOR
SUSTAINABLE AGRICULTURE, INC.

BY: Ron Hight

BY: Robert L. Adams

TITLE: Refuge Manager

TITLE: Exec. Director, Kerr Center


DATE: June 9, 1998

DATE: June 9, 1998

Appendix C

Citrus Grove Tank Closure Report

SEP 22 '03 13:06 FR 4078611276 TO 73694 P.12



Oxy-Cat™

**ABOVEGROUND STORAGE TANK
CLOSURE REPORT**

**Merritt Island National Wildlife Refuge
Grove Road and Space Commerce Way**

November 11, 2002

Project No. 02022

Prepared for:

Merritt Island National Wildlife Refuge
PO Box 6504
Titusville, Florida
32782

Prepared By:

Asset Recovery Group, Inc.
2140 W. King Street
Cocoa, Florida 32926

West King Street • Cocoa, Florida 32926 • Phone (321) 504-7300 • Fax (321) 504-7380 • E-Mail: Florida@oxy-cat.com

SEP 22 '03 13:07 FR

4278611276 TO 73694

P.13

Merritt Island National Wildlife Refuge- AST Closure Report
Asset Recovery Group, Inc.
Project Number 02022

TANK CLOSURE REPORT

Facility: Merritt Island National Wildlife Refuge
Grove Road and Space Commerce Way

FDEP Facility No: 059802030

Owner: Merritt Island National Wildlife Refuge
PO Box 6504
Titusville, Florida 32782

Date Inspected: 8/15/02

ARG Representative: Jim Carey

Tanks Closed: Tank # 1 - 8,000 gallon petroleum based crop oil

Tank Condition: The tank was located on a concrete slab within a concrete block containment area. The containment area was covered with a tin roof. The tank appeared to be in excellent condition. There was no sign of discharge within the containment area.

Excavation Area: NA

Depth To Water: Approximately 5 feet.

Soil Screening: Soils samples were obtained on October 30, 2002 during a site investigation. This activity was conducted after removal of the aboveground storage tank. Soil samples were collected at each corner of the containment structure, along the edge of the containment structure, and at the north end where the dispenser was located. Soil samples were screened with an Organic Vapor Analyzer (OVA) equipped with a flame-ionization device (FID) in accordance with Florida Department of Environmental Protection (FDEP) Chapter 62-770.200 FAC. The soil samples were placed in jars with an aluminum foil seal placed over each jar. Each jar was screened by inserting the tip of the OVA through the aluminum foil seal. For those samples that exhibited an OVA response greater than ten (10) ppm, the second jar was screened using an activated carbon filter. The filtered reading was then subtracted from the unfiltered sample to obtain the total petroleum hydrocarbon reading.


SEP 22 '03 13:07 FR

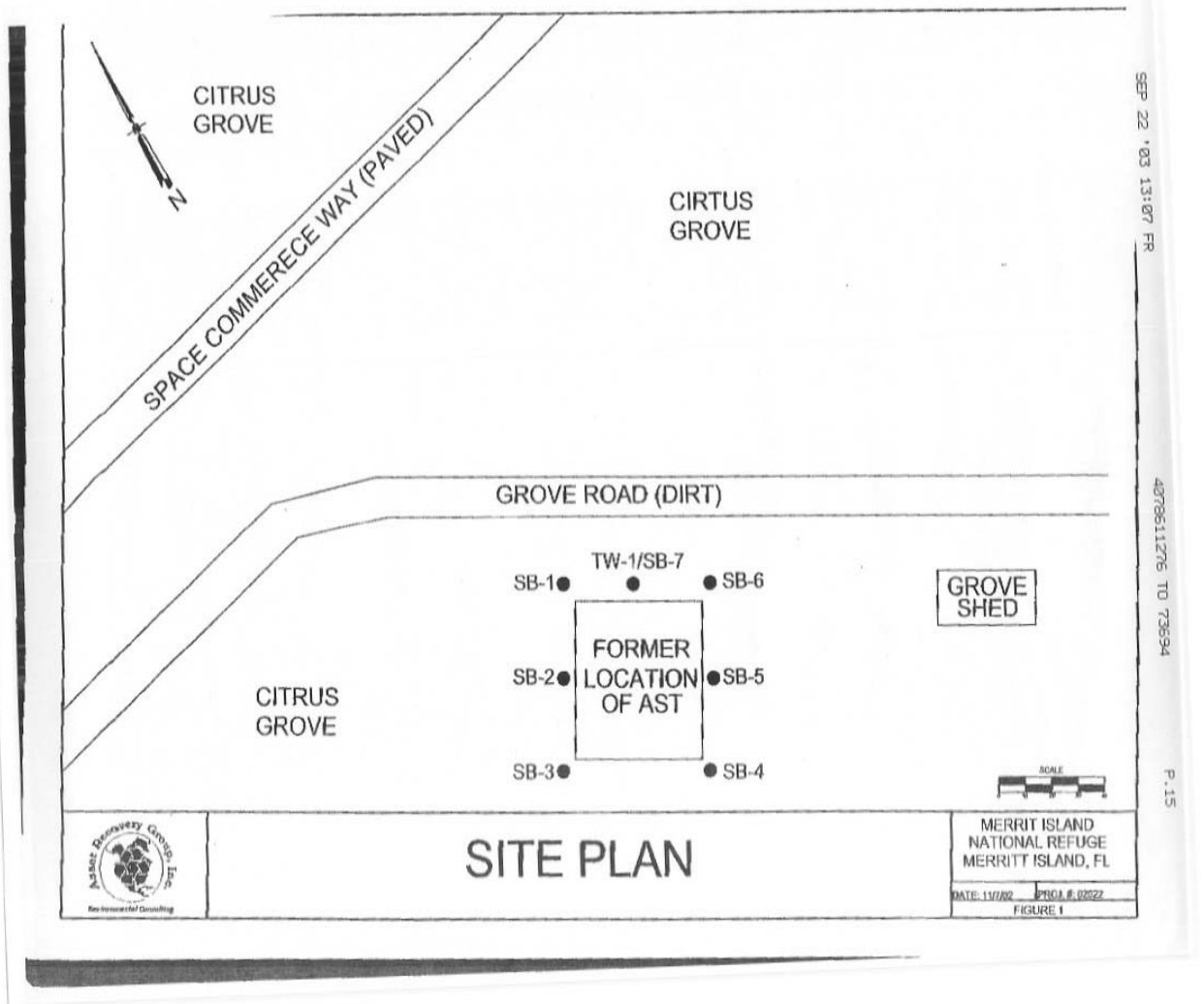
4078611276 TO 73694

P.14

Mentit Island National Wildlife Refuge- AST Closure Report
Asset Recovery Group, Inc.
Project Number 02022

- OVA Readings:** No soil sample displayed a reading above 2 parts per million (ppm) during the soil screening process. The location of the soil samples can be seen in **Figure 1, Table 1.0, Attachment A** contains a summary of the soil screening survey OVA results.
- Soil Lab Results:** Soil screening did not identify any impacted soils, and there was no visible evidence of impacted soils. Therefore, one confirmatory soil sample was collected from the north end of the containment area where the contents of the tank were dispensed. The soil sample (SB-7) was submitted to an independent laboratory for analyses of adsorbed phase hydrocarbons by EPA Test Method 8021B (BTEX+MTBE), EPA Test Method 8310 (polynuclear aromatic hydrocarbon) and FL-Pro (Total Petroleum Hydrocarbons (TPH)).
- The laboratory analysis of the soil sample reported that all compounds reported by EPA Test Method 8021B, and EPA Test Method 8310 were below Method Detection Limits. Results of the FL-PRO analysis revealed a concentration of 9.6 milligrams per kilogram (mg/Kg). However, this is significantly less than the 340 mg/Kg cleanup goal established in Table V of Chapter 62-777 for Resource Protection/Recovery. A copy of the FDEP Closure Assessment Form is contained in **Attachment B**. A copy of the laboratory report is contained in **Attachment C**.
- Groundwater Sampling:** One Groundwater sample was collected from a temporary well installed into the groundwater at the north end of the containment structure where product was dispensed from the tank. A photograph showing the location of the temporary well is provided in **Attachment D**.
- Groundwater Quality:** The laboratory analysis of the groundwater sample reported that all compounds reported by EPA Test Method 8021B, EPA Test Method 8310, and FL-PRO were below Method Detection Limits. A copy of the laboratory report is contained in **Appendix C**.
- Conclusion:** The data collected during this investigation indicate that soils and groundwater have not become impacted with petroleum products during operation of this petroleum storage system.
- Recommendations:** Based on the findings of this investigation, Asset Recovery Group recommends that a decision for No Further Action be issued for this site.


James S. Carey, P.E.
Asset Recovery Group, Inc.



SEP 22 '03 13:07 FR

4078611276 TO 73694

P.16

Table 1 Soil Screening Results

Merritt Island National Wildlife Refuge

Location	Depth	OVA Reading	
		unfiltered	filtered
SB-1	1'	<2 ppm	NA
SB-1	3'	<2 ppm	NA
SB-1	5'	<2 ppm	NA
SB-2	1'	<2 ppm	NA
SB-2	3'	<2 ppm	NA
SB-2	5'	<2 ppm	NA
SB-3	1'	<2 ppm	NA
SB-3	3'	<2 ppm	NA
SB-3	5'	<2 ppm	NA
SB-4	1'	<2 ppm	NA
SB-4	3'	<2 ppm	NA
SB-4	5'	<2 ppm	NA
SB-5	1'	<2 ppm	NA
SB-5	3'	<2 ppm	NA
SB-5	5'	<2 ppm	NA
SB-6	1'	<2 ppm	NA
SB-6	3'	<2 ppm	NA
SB-6	5'	<2 ppm	NA
SB-7	1'	<2 ppm	NA
SB-7	3'	<2 ppm	NA
SB-7	5'	<2 ppm	NA

SEP 22 '03 13:08 FR

4878611276 TO 73694

P.17



Department of Environmental Protection

1 Towers Office Building • 2800 Blair Stone Road • Tallahassee, Florida 32399-2400

DEP Form 62-761.820-1
Form Title: Limited Closure
Summary Report
Effective Date: 7/13/98

Limited Closure Summary Report

This form is required for facilities that have sites with documented contamination requiring a site assessment in accordance with Chapter 62-770, F.A.C. This includes those facilities that are eligible for the Early Detection Incentive Program (EDI), the Florida Petroleum Liability and Restoration Insurance Program (FPLRIP), and the Petroleum Cleanup Participation Program (PCPP), pursuant to Sections 376.3071 and 376.3072, F.S. Documentation of procedures followed, and results obtained during closure shall be reported in this form, along with any attachments. This form shall be submitted to the County within 60 days of completion of the closure in accordance with Section A of the "Storage Tank System Closure Assessment Requirements."

Complete All Applicable Blanks. Please Print or Type

General Information

Date: <u>11/12/02</u>	FDEP Facility ID Number: <u>059402030</u>	County: <u>Brevard</u>
Facility Name: <u>Marine Fuel Oil & Waste Storage</u>		Facility Telephone #: ()
Facility Address: <u>Grange Road & Grange Commercial Blvd</u>		
Owner or Operator Name: <u>Steven Johnson</u>		Owner/Operator phone #: <u>(321) 941-0467</u>
Mailing Address: <u>PO Box 6504 Titusville FL 32762</u>		

Storage Tank System Closure Information

1. Were the storage tanks(s): (Check one or both)

<input checked="" type="checkbox"/> Aboveground	<input type="checkbox"/> Underground
---	--------------------------------------

2. General System Information

Types of Products Stored: <u>Crop Oil</u>	Number of Tanks Closed: <u>1</u>	Age(s) of Tanks: <u></u>
---	----------------------------------	--------------------------

3. Was the Limited Closure Summary Report Performed as a Result of: (check one or more)

<input checked="" type="checkbox"/> Tank Systems Removal?	<input type="checkbox"/> Spill Containment Installation?	<input type="checkbox"/> Change in Storage to a Non-Regulated Substance?
<input type="checkbox"/> Tank Systems Closed in Place?	<input type="checkbox"/> Dispenser Liners Installation?	<input type="checkbox"/> Release Prevention Barrier Installation?
<input type="checkbox"/> Piping Pump Installation?	<input type="checkbox"/> Secondary Containment Installation?	<input type="checkbox"/> Other? (please explain): <u></u>

4. Please Check Yes or No to the following:

a. Was there previously reported contamination discovered on site? If yes, was	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
1. A Discharge Report Form submitted to the County?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. An investigation performed in accordance with Rule 62-761.820, F.A.C.?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. Is the depth to groundwater less than 20 feet?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
c. Are there monitoring wells on site? If yes, were they	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
1. Groundwater monitoring wells?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. Vapor monitoring wells?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
3. Used for closure assessment sampling?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4. Properly closed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5. Retained for site assessment purposes?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
d. If tanks were replaced, were contaminated soils returned to the tank excavation?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Signature of owner or operator

Signature of person performing
Limited Closure Assessment

Name of person performing
Limited Closure Assessment

(date)

(date)

11/12/02
Printed on recycled paper.

Affiliation: East Process Group Inc.

SEP 22 '03 13:08 FR

4078611276 TO 73694

P.18



Client #: ORL-11-110401
Address: Asset Recovery Group Inc.
2140 W. King Street
Cocoa, FL 32926
Attn: Jim Carey

Page: Page 1 of 2
Date: 11/06/2002
Log #: L69268-1

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Percent Solids							
Percent Solid	81	%	SM2540B	0.10	11/01	11/01	KB
Nuclear Aromatic Hydrocarbons							
nthalene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-methylnaphthalene	BDL	mg/kg (dw)	3550/8270	0.25	10/31	11/02	LB
2-methylnaphthalene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-maphthylene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-naphthene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-orene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-manthrene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-hracene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-oranthene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
1-ene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
zo(a)anthracene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
ysene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
zo(b)fluoranthene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
zo(k)fluoranthene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
zo(a)pyrene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
eno(1,2,3-c,d)pyrene	BDL	mg/kg (dw)	3550/8270	0.074	10/31	11/02	LB
enzo(a,h)Anthracene	BDL	mg/kg (dw)	3550/8270	0.12	10/31	11/02	LB
zo(g,h,i)perylene	BDL	mg/kg (dw)	3550/8270	0.074	10/31	11/02	LB
ution Factor	1.0		3550/8270	0.12	10/31	11/02	LB
rogate Recoveries:							
robenzene-d5	117	%	3550/8270	15-121	10/31	11/02	LB
luorobiphenyl	116	%	3550/8270	42-111	10/31	11/02	LB
phenyl-d14	117	%	3550/8270	37-143	10/31	11/02	LB
Alkyl Petroleum X-range Organics (C8-C40)							
	9.6	mg/kg (dw)	FLPRO	6.2	11/01	11/02	RR

SEP 22 '03 13:08 FR

4078611276 TO 73694

P.19

Client #: ORL-11-110401
Address: Asset Recovery Group Inc.
2140 W. King Street
Cocoa, FL 32926
Attn: Jim Carey

Page: Page 2 of 2
Date: 11/06/2002
Log #: L69268-1

Sample Description:

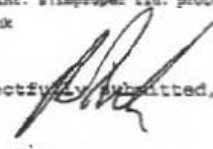
Analytical Report: SB-7
Date Sampled: 10/30/2002
Time Sampled: 10:18
Date Received: 10/31/2002
Collected By: Client

Proj. #: MINWR

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Florida Petroleum Range Organics (continued)							
Dilution Factor	1.0		FLPRO		11/01	11/02	RR
Surrogate Recoveries:							
-Terphenyl	63.0	%	FLPRO	62-109	11/01	11/02	RR
nitriacontane	19.0 IL	%	FLPRO	60-118	11/01	11/02	RR
PAH Compounds							
benzene	BDL	mg/kg (dw)	5035/8260	0.0018	10/31	11/05	LN
toluene	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
ethylbenzene	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
o-tal Xylenes	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
m-XE	BDL	mg/kg (dw)	5035/8260	0.0046	10/31	11/05	LN
Dilution Factor	0.74		5035/8260		10/31	11/05	LN
Surrogate Recoveries:							
ibromofluoromethane	62.0	%	5035/8260	52-155	10/31	11/05	LN
luene-d8	47.0	%	5035/8260	47-154	10/31	11/05	LN
Bromofluorobenzene	19.0 MI	%	5035/8260	36-138	10/31	11/05	LN

11 analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAP requirements.
 Lgs: BDL or U-below reporting limit; DL-diluted out; IL-meets internal lab limits; MI-matrix interference; NA-not appl.
 Lgs: CFR-Pb/Cu rule; ND-non detect (RL estimated); NPL-no free liquids; dw-dry wt; ww-wet wt; C(8)-see attached GUS code
 SP Flags: J(8)-estimated; 1-surr. Fail 3: no known QC req. 3:QC fail 4R or 4RPD; 4-matrix int. 5:improper fld. protocol
 SP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < 95%; V-present in blank
 SP Flags: Y-improper preservation; B-colonies exceed range; I-result between MDL and PQL

980126 DOHS I86240 NC CERT# 444
 DOHS 86122,86129,868048 ADEM ID# 40880 IL CERT# 200030
 CERT# 96031001 TN CERT# 02385
 CE GA CERT# 917
 CERT# 00395 USDA Soil Permit# S-35240

Respectfully Submitted,

 Steve Walton
 Client Technical Svcs. Manager

SEP 22 '03 13:09 FR

4078611276 TO 73694

P.20

Client #: ORL-11-110401
Address: Asset Recovery Group Inc.
2140 W. King Street
Cocoa, FL 32926
Attn: Jim Carey

Page: Page 1 of 2
Date: 11/06/2002
Log #: L69268-2

Sample Description:

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
BTEX Compounds							
Benzene	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Toluene	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Ethylbenzene	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Total Xylenes	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
MTBE	BDL	ug/l	5030/8021	1.0	11/05	11/05	UE
Dilution Factor	1.0		5030/8021	1.0	11/05	11/05	UE
Surrogate Recoveries:					11/05	11/05	UE
a,a,a-Trifluorotoluene	115	%	5030/8021	59-144	11/05	11/05	UE
Florida Petroleum Range Organics							
TPH (C8-C40)	BDL	mg/l	FLPRO	0.72	11/04	11/04	RR
Dilution Factor	1.1		FLPRO		11/04	11/04	RR
Surrogate Recoveries:					11/04	11/04	RR
o-Terphenyl	57.0 IL	%	FLPRO	82-142	11/04	11/04	RR
Trinitiacontane	33.0 IL	%	FLPRO	42-193	11/04	11/04	RR
Polynuclear Aromatic Hydrocarbons							
Naphthalene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
2-Methylnaphthalene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
1-Methylnaphthalene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Acenaphthylene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Acenaphthene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Fluorene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Phenanthrene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Anthracene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Fluoranthene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Pyrene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM
Benzo (a) anthracene	BDL	ug/l	3510/8270	0.20	11/02	11/04	GM
Chrysene	BDL	ug/l	3510/8270	1.0	11/02	11/04	GM

SEP 22 '03 13:09 FR

4078611276 TO 73694

P.21

Client #: ORL-11-110401
Address: Asset Recovery Group Inc.
2140 W. King Street
Cocoa, FL 32926
Attn: Jim Carey

Page: Page 2 of 2
Date: 11/06/2002
Log #: L69268-2

Sample Description:


Analytical Report: TW-1
Date Sampled: 10/30/2002
Time Sampled: 13:45
Date Received: 10/31/2002
Collected By: Client

Proj. #: MINWR

Parameter	Results	Units	Method	Reportable Extr. Limit	Anly. Date	Analyst
Polynuclear Aromatic Hydrocarbons (continued)						
benzo(b)fluoranthene	BDL	ug/l	3510/8270	0.20	11/02	GM
benzo(k)fluoranthene	BDL	ug/l	3510/8270	0.50	11/02	GM
benzo(a)pyrene	BDL	ug/l	3510/8270	0.20	11/02	GM
indeno(1,2,3-c,d)pyrene	BDL	ug/l	3510/8270	0.20	11/02	GM
benzo(a,h)anthracene	BDL	ug/l	3510/8270	0.20	11/02	GM
benzo(g,h,i)perylene	BDL	ug/l	3510/8270	1.0	11/02	GM
dilution Factor	1.0		3510/8270		11/02	GM
Inorganic Recoveries:						
nitrobenzene-d5	28.0	μ	3510/8270	22-117	11/02	GM
fluorobiphenyl	34.0	μ	3510/8270	34-150	11/02	GM
xyphenyl-d14	33.0	μ	3510/8270	58-160	11/02	GM

All analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAP requirements.
 ug: ug/L or U-below reporting limit; DL-diluted out; IL-mets internal lab limits; MI-matrix interference; NA-not appl.
 ug: CPM-Pb/Cu rule; ND-not detect (RL estimated); NPL-no free liquids; dw-dry wt; ww-wet wt; C(#)-see attached US code
 EP Flags: J(#)-estimated 1:surr. fail 2:no known QC req. 3:QC fail NR or WRD; 4:matrix int. 5:improper fld. protocol
 EP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < MDL; V-present in blank
 EP Flags: Y-improper preservation; B-colonies exceed range; I-result between MDL and PCL

390126 DCH# E86240 NC CERT# 444
 DCH# 86122,86109,E86048 ACH# ID# 40850 IL CERT# 200020
 CERT# 96031001 TN CERT# 02985
 TN GA CERT# 917
 CERT# 00395 USDA Soil Permit# S-35240

Respectfully submitted,

 Steve Walton
 Client Technical Svcs. Manager

Appendix D

Quarterly Sampling Result Tables Pump House 6, 2001-Present

NASA Citrus Grove Data 2001-Present

SITE ID NUMBER	Date	PO4 mg/L (1)	NO3 as N mg/L (1)	NO2 as N mg/L (1)	NOX as N mg/L (1)	TKN mg/L (1)	T-N mg/L (1)	T-P mg/L (1)	Water Temp (deg. C)	DO (mg/l)	pH (su)	Cond (us/cm)	Cond (ms/cm)	Salinity (ppt)	Turbidity (NTU)
CGK-N-6	9/18/01	0.45	<1.0*	<1.0*	<2.0*	1.2	<2.2	<0.10	27.2	2.3	7.57	3740	3.74	0.33	2.18
CGK-N-6	11/16/01	0.54	0.11	<0.044	<0.154	1.2	1.3	0.51	20.1	2.01	7.30	1180	1.180	0.05	6.7
CGK-N-6	03/27/02	0.014	3.1	<0.044	3.1	2.6	5.7	0.22	26.0	0.36	8.00	3460	3.460	0.17	21.3
CGK-N-6	06/20/02	0.19	0.064	NA	0.081	1.5	1.6	0.22	24.2	0.92	7.28	4970	4.97	2.7	7.6
CGK-N-6	09/05/02	0.084	0.0075 U	0.0057 J	0.012 J	1.0	1.0	0.13	25.7	2.62	7.29	2408	2.408	1.2	7.11
CGK-N-6	11/14/02	0.24	0.050 J	0.0022 U	0.052 J	1.5	1.6	0.28	21.3	1.08	7.47	2298	2.298	1.2	3.57
CGK-N-6	03/06/03	0.10	0.060 B	0.25 U	0.30 U	0.59	0.59 B	0.11	21.5	2.35	7.49	2012	2.012	1	2.74
CGK-N-6	06/24/03	0.96	0.0075 U	0.014	0.018	1.8	1.9	1.1	29.2	2.38	7.28	2737	2.737	1.4	6.24
SWCTL		J	(-)	(-)	(-)	(-)	(-)	(-)	(-)	>5.0	6-8.5	1250*	1.250*	(-)	≤28 NTU >bkgd

Notes:

Values in bold font are in excess of MCL criteria.

SWCTL – Criteria from 62-302, Criteria For Surface Water Quality Standards, Class III, Predominantly Fresh; or F.A.C. 62-777, Groundwater and Surface Water Cleanup Target Levels

(-) - No Applicable Standard

* - Chapter 62-302.530, Florida Administrative Code (FAC). Criteria for Surface Water Quality Classifications for

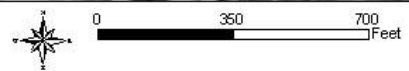
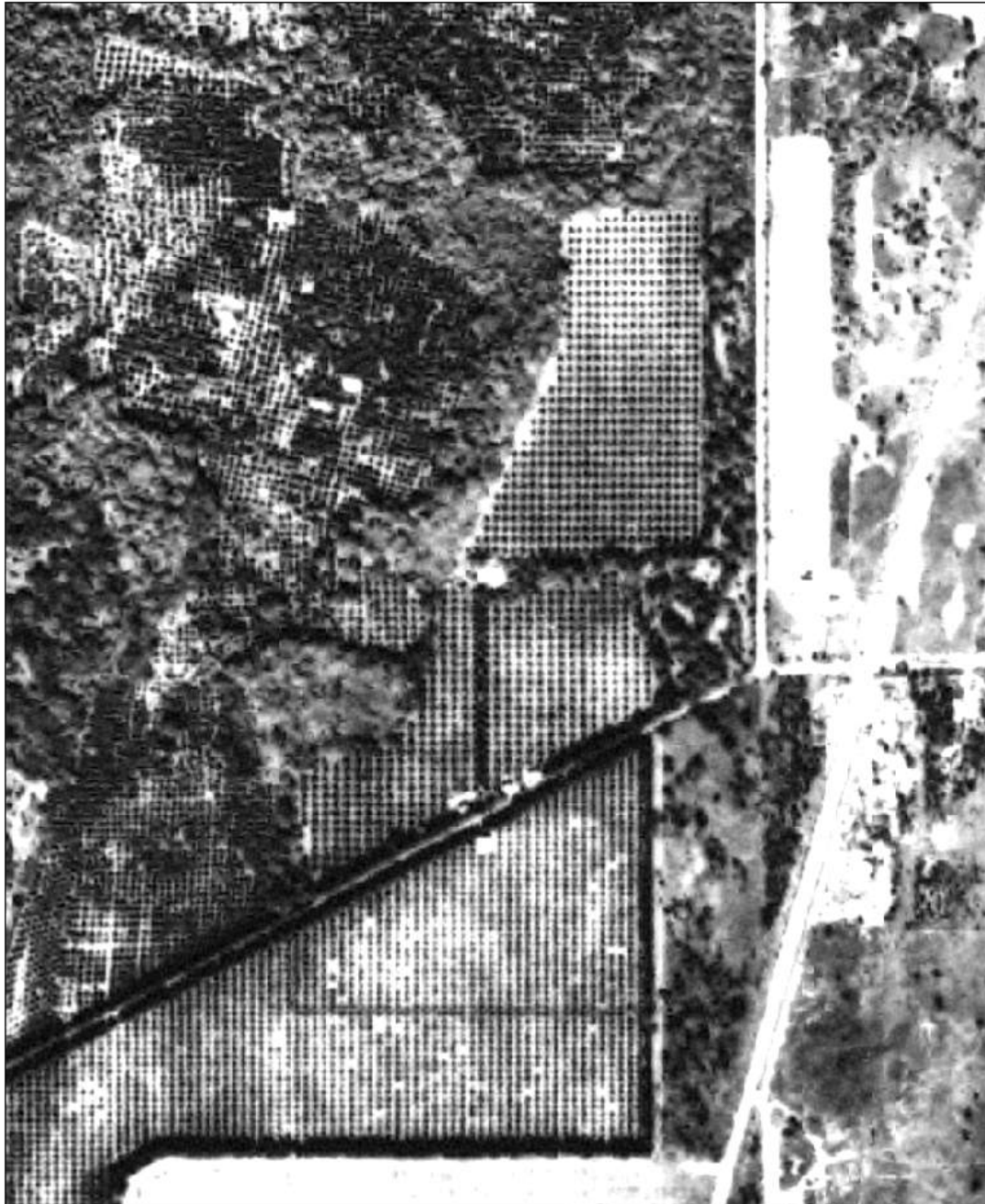
Predominantly Fresh, Surface Waters: Conductivity shall not be increased more than 50% above background, or 1275 (Umhos/cm, (1.250 ms/cm), whichever is greater.

Results followed by the letter "J" or "B" indicate an estimated value detected between the Laboratory's Reporting Limit (RL) and the respective Method Detection Limit (MDL).

Results followed by the letter "U" indicate the analyte was not detected at the MDL. The MDL value is substituted here for the non-detect.

Appendix E

1943 Historical Aerial Photograph



Appendix F

Dynamac Corporation KSC Background Study Results

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

	SSC163 #	SSC164 #	SSC165 #	SSC166 #	SSC167 #	SSC168 #	SSC169 #	SSC170 #	SSC171 #	SSC172 #	SSC173 #	SSC174 #	SSC175 #	SSC176 #
			08/12/98				6/30/98							
			duplicate				duplicate							
Organochlorine Pesticides (8087)														
4,4'-DDE	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
4,4'-DDE	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
4,4'-DDT	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Aldrin	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Alpha-BHC	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Beta-BHC	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Chlordane (alpha)	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Chlordane (gamma)	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Chlordane (total)	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Delta-BHC	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Endrin	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Endosulfan I	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Endosulfan II (beta)	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Endosulfan Sulfate	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Endrin	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Endrin Aldehyde	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Endrin Ketone	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Gamma-BHC (Lindane)	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Heptachlor	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Heptachlor Epoxide (a)	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Heptachlor Epoxide (b)	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Isoflin	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Methoxychlor	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Mirex	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Toxaphene	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Absorbers (8082)														
PCB-101/61/242	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
PCB-1221	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
PCB-1232	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
PCB-1248	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
PCB-1254	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
PCB-1260	µg/kg	<3.7	<3.6	<3.7	<4.4	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4.1	<4.2	<3.4
Chlorinated Herbicides (8151)														
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-T) (Silvex)	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
2,4-Dichlorophenoxy acetic acid (2,4-D)	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
3,5-DCBA	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
4-Nitrophenol	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Aclufen	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Benflazox	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Chloramben	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Deethyl	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Delapron	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Diamba	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Dichloroprop [2-(2,4-Dichlorophenoxy)propionic acid]	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Diracarb	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
MCPA	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
MCPP	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Pentachlorophenol	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00
Picloram	µg/kg	<1.1	<1.0	<1.1	<1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.3	<1.00

1 = value is between the Method Detection Limit and the Practical Quantitation Level

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC163 #####	SSC164 #####	SSC165 08/12/98 duplicate	SSC166 #####	SSC167 #####	SSC168 #####	SSC169 6/30/98 duplicate	SSC170 #####	SSC171 #####	SSC172 #####	SSC173 #####	SSC174 #####	SSC175 #####	SSC176 #####
*** PAH (8310) ***															
1-Methylnaphthalene	µg/kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	20	<21
2-Methylnaphthalene	µg/kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	42	<21
Acenaphthene	µg/kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	<20	<21
Acenaphthylene	µg/kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2
Anthracene	µg/kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	<20	<22
Benzo(a)anthracene	µg/kg	<1.9	2.8	2.4	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1
Benzo(a)pyrene	µg/kg	<2	9	2.1	3.1	<2	<2	<2	<2	<2	<2	<2	<2	<2	4
Benzo(b)fluoranthene	µg/kg	<3	7.1	4.1	4.1	<3	<3	<3	<3	<3	<3	<3	<3	<4	<4
Benzo(g,h,i)perylene	µg/kg	<3.7	9.8	1.3	12.1	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3
Benzo(k)fluoranthene	µg/kg	<2	3.1	<2	<3.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chrysene	µg/kg	<1.9	3.7	<1.9	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1
Dibenz(a,h)anthracene	µg/kg	<3.7	<3.5	<3.7	<4.5	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3
Fluoranthene	µg/kg	<3.7	<3.5	<3.7	<4.5	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3
Fluorene	µg/kg	<3.7	<3.5	<3.7	<4.5	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3
Indeno(1,2,3-cd)pyrene	µg/kg	<1.9	6.7	8.9	15	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1
Naphthalene	µg/kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	73	<21
Phenanthrene	µg/kg	<1.9	<1.8	<1.9	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1
Pyrene	µg/kg	<1.9	<1.8	<1.9	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1
Surrogates															
2,4-DCAA	%	56	44	112	132	68	52	88	40	72	48	76	64	84	70
2,4,5,6-TCMX	%	57	75	71	70	65	66	54	55	59	69	67	59	69	57
DBC	%	60	124	147	118	75	85	69	58	77	92	105	68	81	60
p-terphenyl	%	105	75	83	83	81	86	73	91	94	90	63	104	103	87
Metals															
Aluminum	mg/kg	7200	2400	2900	3800	490	4600	1200	240	140	1400	210	1200	3700	440
Antimony	mg/kg	<2	<2	<2	<3.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	mg/kg	<0.6	<0.5	<0.6	70.1	<0.5	<0.6	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	2.6	<0.6
Barium	mg/kg	<22	<21	<22	<27	<20	<22	<20	<20	<20	<20	<20	<20	<24	<26
Beryllium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/kg	3800	1900	16000	24000	1700	2200	410	920	500	5900	760	1800	95000	2500
Chromium (total)	mg/kg	20	17	12	15	3.7	30	10	<1	<1	7.2	4.3	24	12	29
Cobalt	mg/kg	<6	<5	<6	<7.0	<5	<6	<5	<5	<5	<5	<5	<5	<6	<6
Copper	mg/kg	100	100	110	110	24	130	51	14	11	64	5.3	70	32	120
Iron	mg/kg	8000	2200	1800	2000	570	3600	1100	180	100	940	110	1300	7200	440
Lead	mg/kg	8.2	8.9	9.5	10	1.9	17	5	1.3	<1	10	15	5.5	5.3	6.3
Magnesium	mg/kg	560	190	510	660	120	440	120	120	85	1000	150	180	840	440
Manganese	mg/kg	99	130	160	150	29	100	17	12	7.5	48	5	65	110	110
Mercury	mg/kg	0.025	0.019	0.02	0.03	<0.01	0.06	<0.01	<0.01	<0.01	0.05	<0.01	0.014	0.013	0.011
Nickel	mg/kg	<6	<5	<7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<6	<150
Potassium	mg/kg	490	<170	260	310	28	170	70	36	<25	92	<25	62	300	64
Selenium	mg/kg	<2	<2	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Silver	mg/kg	<2	<2	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sodium	mg/kg	31	17	31	36	20	24	15	13	16	29	14	20	330	29
Thallium	mg/kg	<1	<1	<6	<7	<1	<1	<1	<1	<1	<1	<1	<1	2.3	<1
Vanadium	mg/kg	18	6.2	4	4.6	1.3	9	2.5	<1	<1	1.9	<1	2.4	19	1.9
Zinc	mg/kg	58	25	71	76	14	56	7.8	7	<5	36	<5	32	32	66

J = value is between the Method Detection Limit and the Practical Quantitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:10)
** = 8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC163 #####	SSC164 #####	SSC165 08/12/98 duplicate	SSC166 #####	SSC167 #####	SSC168 #####	SSC169 6/30/98 duplicate	SSC170 #####	SSC171 #####	SSC172 #####	SSC173 #####	SSC174 #####	SSC175 #####	SSC176 #####
Other Parameters															
Bulk Density	g/cm ³	1.2	1.1	1	1	1.3	1.1	1.2	1.2	1.3	1.2	1.3	1.1	1.2	1.1
CEC	meq/100g	23	10	31	29	6	20	7	4	9	8	6	9	17	8
Percent Solids	%	89	95	89	74	98	90	97	99	99	98	99	98	83	98
pH (lab)	S.U.	6.3	6	7.4	7.6	7.2	6.9	6.8	7.2	6.8	7.7	7.2	7.4	7.6	6.1
Resistivity	ohm-cm	48000	110000	32000	29000	<12	1400000	<12	<12	<12	1600000	<12	<12	350000	<12
Texture (No. 4)	%	100	100	99.9	100	99.7	100	98.6	100	100	99	100	100	98.2	100
Texture (No. 10)	%	99.8	100	99.78	99.9	99.6	99.7	98.3	100	99.9	98.5	100	100	93.8	99.9
Texture (No. 40)	%	94.4	98	96.8	97	85.4	85.3	96.9	98.4	99.7	97.5	87.4	83.5	84.7	98.6
Texture (No. 60)	%	83	91.4	89.7	89.9	51.4	57.3	92.3	91.6	92.1	94.7	58.1	56.7	78.3	84.1
Texture (No. 100)	%	50.2	57.8	52.8	57.2	15.3	28	57.8	51.9	52	58	17.6	21.9	51.4	22.7
Texture (No. 200)	%	18.1	12.3	20.7	19	4.2	10.5	8.4	9.9	9.6	8.6	4.7	5	14.2	11.4
Total Organic Carbon	mg/kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	9800

I = value is between the Method Detection Limit and the Practical Quantitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** = 8310s were diluted (1:10)

Appendix G

List of Federally and State Protected Wildlife Species within the ISRP Area

Protected wildlife species potentially occurring within a 0.8 km (0.5 mi.) radius of Ransom Road, Kennedy Space Center, June 2002

Scientific Name	Common Name	Level of Protection	Citrus Groves	Transmission Lines	Freshwater Marshes	Mixed Scrub-shrub Wetland	Mixed Wetland Hardwoods
Amphibians and Reptiles							
<i>Rana capito aesopus</i>	Florida gopher frog	state			X		
<i>Alligator mississippiensis</i>	American alligator	federal			X		
<i>Gopherus polyphemus</i>	Gopher tortoise	state	X	X	X		
<i>Drymarchon corais couperi</i>	Eastern indigo snake	federal	X	X	X	X	X
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	state					
Birds							
<i>Haliaeetus leucocephalus</i>	Bald eagle	federal					
<i>Apelocoma coerulescens</i>	Florida scrub-jay	federal		X			
Mammals							
<i>Podomys floridanus</i>	Florida mouse	state					

Scientific Name	Common Name	Level of Protection	Pine Flatwoods	4-lane Roads with Medians	Upland Mixed Coniferous/Hardwood	Wet Prairies	Wetland Forested Mixed
Amphibians and Reptiles							
<i>Rana capito aesopus</i>	Florida gopher frog	state				X	
<i>Alligator mississippiensis</i>	American alligator	federal				X	
<i>Gopherus polyphemus</i>	Gopher tortoise	state	X			X	
<i>Drymarchon corais couperi</i>	Eastern indigo snake	federal	X		X	X	X
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	state	X				
Birds							
<i>Haliaeetus leucocephalus</i>	Bald eagle	federal	X				
<i>Apelocoma coerulescens</i>	Florida scrub-jay	federal					
Mammals							
<i>Podomys floridanus</i>	Florida mouse	state	X				